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From: Assistant Technical Officer (Medical), U.S. Naval Forces, Germany.
To: Chief of Bureau of Medicine, (Attn: Chief, Publications Division).
Via: (1) Technical Officer, U.S. Naval Forces, Germany.
(2) Chief of Naval Operations (Op-32-F2).

Subject: Report of Third Conference of the Medical Consultants to the Wehrmacht - Forwarding of translation of.

Reference: (a) Letter P 3-1(b) Serial 207 dated 2 January 1948 from Head, Medical Section, Office of Naval Advisor, OMGUS.
(b) Letter P 3-1(b) Serial 208 dated 2 January 1948 from Head, Medical Section, Office of Naval Advisor, OMGUS.

Enclosure: (A) Subject Translation (Project I, Folios V,VI)

1. Due to its bulk, Enclosure A will be forwarded under separate cover direct to each of the below listed recipients of a copy of this letter.

2. This is a continuation of Project I of this section, parts of which have been forwarded previously by references a and b.

3. To avoid inconsistencies in the make up of the bound material these folios have been issued under the heading Medical Section, Naval Technical Unit, Europe altho administrative reorganizations have changed the designation to Medical Section, Office of Naval Advisor, OMGUS and more recently as noted at the heading of this letter.

4. The reserve supply of these folios is limited. It will be forwarded to Bureau of Medicine and Surgery, Publications Division on a Government Bill of Lading. Requests for additional copies or further distribution should be addressed to that office.

Harry J. Alvis

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VII.

PROCEEDINGS OF THE CONSULTANTS' COMMITTEE ON INTERNAL MEDICINE.

Translation prepared by:

Office of Military Government for Germany (U. S.)
Office of Naval Advisor
Medical Section

Treatment of carriers of diphtheria bacilli
(See Section VI, Article 9)

Ridding carriers of intestinal protozoa
(See Section VI, Article 10)

Threat of malaria for the German population
(See Section VI, Article 11)

Treatment of gunshot wounds with sulfonamides
(See Section II, Article 6)

Treatment of post-diphtheritic paralyses with vaccino-malaria
(See Section XI, Article 6)

Pathology of injuries caused by inoculation
(See Section VIII, Article 3)

1. Possibilities of calling up men suffering from ulcer for active service.

Oberstabsarzt (Major, MC.) Prof. STEIN

Diseases of the stomach are a part of the complex of complaints that impairs efficiency and fitness for service most. A good soldier will as a rule not report himself ill on account of moderate or vague troubles immediately, but a large number of men with stomach diseases are inclined to consult the doctor early. The medical officers in the field are not in a position to carry out the necessary examinations. Besides, the diagnosis cannot always be made with the required reliability in the field hospitals. Even if a diagnosis is made there, the available medical attention often cannot effect complete healing. So a stream of men with disorders of the stomach flows backwards, and during periods of important military operations, considerable numbers of them reach home hospitals. If today it is properly demanded on principle that a greater number of the sick, including those with infectious diseases, should, whenever possible, be retained near their units, or in the army group area, this demand applies all the more for men with stomach trouble, in so far as military conditions will allow. It is a characteristic of stomach complaints, that they must be cured within a definite limit of time and the patient must be restored to efficiency. The longer the period of medical treatment, the less will be the chances of sending the patient back to his unit in a state of efficiency. The crisis may occur from the 6th to the 8th week approximately. But this critical limit will be exceeded the more easily, the farther the patient is removed from his unit and the more frequently he is sent from hospital to hospital.

As to our fundamental view of the nature and significance of stomach diseases, particularly in war time, I do not think it justified to make a difference on principle between patients with a proven ulcer and patients with inflammatory, secretory and spastic disorders without an ulcer.

As regards diagnosis of course, this does not change the necessity for an exact examination in every single case. Both groups have in common the changed reaction of vegetative functions. These may be uniform or multiform and complicated or even hidden. It is not within the scope of my task to describe these functional disorders, but in forming an opinion of men with stomach diseases the following considerations are important:

1. The more severe and multiform the vegetative functional disorders are, the more will the temper and behavior of the individual be changed. The trend of the development is always towards loss of energy and force of will and towards an unsocial attitude and it is this process that impedes the patient's guidance and treatment more than do circumscribed functional disorders and a circumscribed anatomical defect.

2. The general vegetative functional disorders will precede the development of local changes and also the development of peptic or duodenal ulcers. Even before the war, we were able to demonstrate in some cases requiring observation for other reasons that the beginning of gastritis and ulcer are preceded by gradually developing disorders of general vegetative functions. This could be shown particularly clearly in case of the development of hypotonic conditions combined with bradycardia.

3. During the last few years and even before the war, functional disorders within the vegetative nervous system were increasing amongst most of the European nations. This steady increase suggests that also an increase of intestinal disorders may be connected with it, but it could not yet be settled statistically, whether this is the case. At all events, an increase of intestinal disorders strictly speaking has not been proved safely so far. In any case, in tackling the problem of intestinal diseases one must consider the fact that major vegetative functional disorders have been increasing. The possibility of calling up men with intestinal diseases for active service in wartime is now chiefly dependent on therapeutic principles and their observation. It is probably due to repeated and radical changes in the concepts concerning origin and nature of intestinal diseases and the still prevailing inexactness in forming an opinion concerning these diseases that in hardly any other medical field have so many suggestions of treatment - partly contradictory - been made. This applies to the operative field as well as to conservative therapeutics. There are vast numbers of dietetic suggestions alone, from a strict Sippy-diet to unrestricted nutrition according to MEULENGRACHT. Every expert in the treatment of men suffering from stomach diseases will agree with me, that it is not so decisive whether one or the other diet is selected if the term diet is understood to mean not much more than the kind of nutrition. In this sense, diet is not decisive at all. It is quite another matter if diet is understood to mean a strict regulation of the whole way of life and all potentialities of the entire personality in the sense of the ancient hippocratic dietetics. This is

indeed decisive, and the chief thing is here the adaption to the respective state of the organ, function, and personality. Two principles, which retain their unchanged importance in all fields of medical treatment, the principle of putting at rest and the principle of exercise, must be fully considered here also. It is a fundamental error to believe that, through prolonged confinement to bed, the diseased organ may be put to rest especially well or even that the vegetative functional disorders and the attitude of the entire personality may be favorably influenced. This is incompatible with the physiological facts and ideas as well as with our knowledge and experience as regards the temper of men suffering from ulcer. For about 10 years I have made it a fixed rule to confine to bed all men suffering from intestinal diseases, special complications expected, for the shortest possible period, i.e. to replace absolute rest by exercise, increasing the strain gradually. Of course, every man afflicted with ulcer required absolute rest during the first few days. Particularly so if, in order to spare the diseased mucous membranes, a brief but most strict tea and gruel diet is prescirbed during the first few days. In most uncomplicated cases, one can even after a few days carry out exercise-therapy with active and passive exercises, with massage and other adequate measures. In most cases, this can be done even after about seven days. A treatment, partly of rest, partly of exercise will be gradually transformed into therapeutic training with the aim of attaining a normal tonic regulation, particularly in the field of blood circulation and the highest possible capacity for undergoing a certain strain. Without setting definite limits, the steps of treatment by exercise with a strict division of the day, will proceed to routine military exercises. Hospital treatment of patients with stomach diseases must aim at sending back to their units the largest possible number of these men in a condition of absolute fitness for service, and every hospital is naturally bound to prove this fitness for service during their stay at the hospital. At the same time, this will be for the patient himself the best conviction of the success of the treatment, of his restoration and his actual fitness for military service. I, however, must emphasize the fact, that, as long experience has shown me, a treatment with confinement to bed for many weeks makes the patient feel more and more ill, has a bad influence on the spastic appearances and by no means removes atony and general lack of energy, but on the contrary, increases it and makes it work. In many cases, the typical features of a change of character in our patients suffering from ulcer will develop only during the long treatment with rest, lack of occupation, and boredom. Hospital wards with patients suffering from intestinal diseases, who are left to their own resources without any activity whatever, are, as general experience shows, hot-beds of ill humor and further despondency and bad soldierly conduct. Only by keeping the patient occupied increasingly, sensibly and systematically, can one succeed by strict military guidance and by sympathizing with the personal troubles of every single patient, in leading him, who is changed by disease,

back to a normal condition by restoring his lost self-confidence and by strengthening his faith in his own efficiency. It is a generally acknowledged fact fully confirmed in the last, as well as in the present war, that, in mobile warfare, men with stomach trouble present no, or only a negligible, problem. Also our numerous follow-up histories show clearly that many men suffering from ulcer were capable of uncomplainingly enduring immense hardships without difficulties. At the same time, this is a corroboration of v. BERGMANN's statement, which he made on the strength of his experiences in the first World War: "Without special food or any other dietetic precaution, it was especially the ulcer complaints that ceased among the combatants, and many a man suffering from ulcer felt well only then, whereas ulcer and gastritis reappeared in the offices and overheated rooms". I consider it an important fact that the combat group with its own strict common laws and its unalterable obligations is the community, into which the patient with intestinal trouble, whose social sense is difficult to rouse, may be introduced most easily and naturally. For this reason, I have been demanding from the very beginning whereever I had some influence on the treatment and judgement of men with stomach diseases, that after successful treatment, the largest possible number of them should be discharged from the service or sent back to the front. Our fairly accurate follow-up of men with intestinal diseases in war time shows that an occupation in formations not operating at the front or employment in the home country and civilian trade, such as armament factories, is in no way better suited to relieve the lot of the patients, to reduce complaints or to limit the number of relapses.

In a special hospital for men with intestinal diseases, the first one established in this war, 60 - 70 per cent of the patients treated there, were sent back to their units as fit for active service or as fit for garrison duty in the field, if they were afflicted with further defects. Preliminary statistics listing 1500 patients who passed through this special hospital within 13 months, show that 70 per cent were still in active service in their units one year after their discharge. In about 50 per cent of them, ulcer had been positively ascertained roentgenologically or gastroscopically. The time being too short, the abundant material, particularly the numerous and valuable follow-up histories, could not be thoroughly evaluated, I am sorry to say. This much may, however, be safely said that it is quite possible to send back to their units a considerable number of the patients suffering from stomach diseases, owing to the rigid treatment briefly outlined in its principles and to keep them fit for active service for a long time. I do consider this procedure not only as possible but even as absolutely necessary for medical as well as military reasons. If this demand is complied with everywhere as strictly as possible, the idea that stomach diseases are not necessarily grave and are not at all liable to lead to unfitness for active service, will probably prevail also with the Army. In the long run, this will also have a favorable influence on the fundamental attitude and original situation of the men suffering from intestinal trouble.

A report of my collaborator Dr. BERG - to whom we are also obliged for drawing up the Heidelberg statistics - which was recently submitted to me, shows clearly that conditions were quite similar in a formation where the army surgeon has been working without interruption with his unit ever since it was first formed. Out of the men described as suffering from intestinal diseases only a little less than 50 per cent remained with the unit for returned to it, and these do full duty, even under the hardest conditions of the Russian winter and of the fiercest fighting at the Eastern front, and they complain rarely or not at all. Though it may seem surprising to us, still they have changed their dispositions by getting accustomed to permanent hardships and so overcame the disease.

Now it goes without saying that a certain number of men suffering from stomach diseases cannot be used for military service from the first. These include the following groups: 1. all men with stomach diseases who have suffered a heavy loss of blood, 2. all patients who have suffered a perforation, 3. all patients with extensive stenosis-symptoms or with considerable inconvenience of digestion due to mechanical causes; 4. all patients who have undergone operations on the stomach.

These groups will always include a comparatively small number of particularly efficient soldiers or men with special training who are, for this reason, more or less indispensable to their units. These men should of course also be sent back to their units, in spite of certain dangers and in spite of the possiblity of having a relapse. In my opinion the only real difficulty in judging them properly exists in another group viz. the patients advanced in years, amongst who recurrences were often found and whose mental attitude cannot be improved while the ulcer is healing. These should be discharged, too, but only after severe judgement and thorough treatment in a special hospital.

It is necessary, however, that all authorities responsible should have the same views on these things, and the possibilities of employment of the patients suffering from ulcer and intestinal diseases should be judged by the same rules. This applies to the surgeon who has to decide on the employment of these men as well as to the surgeon supervising the treatment and particularly to the army medical officer. Now as ever, the hardest task rests with the army surgeon who, in cooperation with the commanding officer, must endeavour to save the patient for the military community.

2. Possibilities of calling up men suffering from ulcer for military service.

Oberfeldarzt (Lt. Col., MC.) Prof. KATSCH

Only recently a surgeon whom I esteem highly, told me that we internists hardly ever find simple formulae for things. This can be explained I dare say, not so much by a lack of resolution on the part of the internist, as by the fact that the living process of diseases is as many sided as the constitution of man. As regards the possibility of calling up men suffering from ulcer for military service, it cannot be reduced to a simple formula, either.

In endavouring to find a simple and prompt solution, we may by no means declare unfit for service all men with positively diagnosed ulcers of the stomach or duodenum. This does not come into question, because there are too many men suffering from ulcer and because it has been proved meanwhile that many of them make excellent soldiers - at least long enough to make it worthwhile. Though I dare say it is generally recognized that military service in war time is often injurious to ulcer patients on the one hand by the military diet, on the other hand by the physical and psychic strain, I think it right to begin this treatis by stating that an ulcer condition will not, as a rule or inevitably get worse under war-conditions and by doing military duty in the home country. There are men suffering from ulcer who feel better in war than in peace.

I know a farmer whom I have been treating for years because of his duodenal ulcer positively proven by X-rays. He had to undergo medical treatment every year. From the time he was called up for military service, he has been quite well nor has he been sensitive as regards his diet any longer. I explain this, at least partly, by the fact, that, as a soldier he feels in his proper element, whereas before, through special conditions, he wasted away through bother with the authorities. Meanwhile, his wife succeeds in dealing with the same authorities much more adroitly.

There is a bank clerk who conscientiously managed a deposit bank and was troubled all the time by his ulcer. As a soldier, he is as fit as a fiddle, now commands a front-line battalion as a major in the reserve and, by taking slight precautions in diet, has never had to interrupt his duties by hospital treatment.

There is a young man wanting to be a soldier at any price. As he has a duodenal ulcer with stenosis, he has been three times declared unfit for service by the medical examiners. He consulted me asking whether I could help him to do something against the decision of the recruiting commission. Considering the findings, I had to refuse. In the end, however, he managed to become a soldier. He managed to get through the period of fundamental training and has been a soldier on the Eastern front for 2 years. I exchange letters with him, because I am interested in the case. Twice he needed hospital treatment for a few weeks. Apart from this, he sticks it out and his superiors seem to think much of him.

There is a veteran of the World War I with chronic ulcer and fairly serious stenosis. He had made up his mind to take part in the Polish campaign and sticks it out from first to last, has had meanwhile a recurrence of complaints which he overcomes by eating moderately of the military diet and by getting milk now and then, a bottle of which he keeps, as a rule, in his belongings.

There are two aviators of the Greifswald training wing whose ulcers I have known of positively from prewar times. I met them again in Greece, whence they were flying very trying long range engagements to Africa. Yet they stuck to this tiring duty though they had a bad time while doing so. It was a terrific strain upon them, and I am bound to say that such longrange flights as dive bombers are particularly wearing for men suffering from ulcer.

These examples, to which myself and everybody else present might add many others, do not apply to the majority of the men suffering from ulcer, but still a considerable number who are excellent soldiers with or even without complaints and who we cannot do without. Enthusiasm for military life, general aptitude for it, sense of duty and good comradeship are all motives having an influence, sometimes even a decisive influence for the possiblity of calling them up for military service. I should like to mention here that, according to a report of Professor v. SALAMANCA (Madrid), the ulcers of a number of his patients were cured in the Bolshevist community jail, certainly not by the jail-diet but, according to our Spanish colleague, by their political enthusiasm.

This effective enthusiams can not be expected of everybody nor can it be created by suggestion. For this reason, the other radical solution of the problem, viz. to declare on principle all men suffering from ulcer as fit for service is impractical too. This would lead to an overcrowding of the hospitals and would deprive the war industries of more or less valuable workers while their fitness for military duty is very dubious. Unfortunately one finds out again and again that men who have been discharged as unfit for military service because of serious organic ulcer findings with complications by a decision in a special hospital, are enlisted again as fit for military service by the Army Recruiting Offices some time later. After a short time, they are in the hospital again, are once more thoroughly examined, X-rayed, judged, and discharged as unfit for military service, and yet they are inducted again after another examination. I found such a perfectly absurd procedure up to seven times with the same man. Some means ought to be found to prevent it. Certain men suffering from ulcer will be of no use as soldiers, that fact is indisputable.

We must make a differentiation concerning the kind of assignment as regards the possibility of enlisting men suffering from ulcer for military service, and this differentiation is not without some difficulties, considering the nature and multiformity of this still strange disease. It requires surgeons not only expert in the special judgement of the particular stomach findings, who not only know roentgen

findings but also grasp the functional and rhythmical peculiarities of the single ulcer case and, in addition to that, understand and, if necessary, know how to influence the personality of the individual ulcer patient. Even though all special internists here present have observed the most varied experiences and different kinds of ulcer patients in war, if all know the alarming contrast that civilian ulcer patients feel no more pain after a few days of hospital treatment although it is true, they are not cured, but whereas such a remarkable number of ulcer patients in military hospitals complain of pain even after a treatment of many weeks - for which reason some declare the entire ulcer disease to be mere neurosis, though they are absolutely wrong - I, unlike many of you, am in a position to make a particular personal contribution to our problem, since I was an expert in ulcer conditions even in the past war. I may call to your minds that I took an active part in the clinical research work which led, before World War I, to the publications of my master v. BERGMANN about ulcer diagnosis and ulcer pathogenesis and that particularly the first internists' debate of 50 proven cases of duodenal ulcer were then published by me conjointly with WESTPHAL under the title which has just now become topical again of "Neurotic Duodenal Ulcer". While the knowledge of the frequency of ulcers and their characteristic complaints had by no means spread generally during the years of World War I, I took part in that war with a fair knowledge of the ulcer disease and its complications and with a deep interest in it - two years and a half as an army surgeon in an infantry regiment, then one year in a general hospital in the home country, then again in a front-hospital where I was in charge of 300 beds for patients with internal diseases. Also that time there were vast numbers of men suffering from ulcer, and particularly at the front. I will not discuss the rather intricate question whether there is today a somewhat higher pecentage of the population suffering from ulcer than before, as it might appear. But this much is certain: the ulcer patients in this war are psychologically in quite a different condition from those of the last war. I mention the following reasons:

1. Ulcer is now diagnosed much better and much more reliably (roentgeno-diagnostic!) in the hospitals, or the patients even bring with them a positive diagnosis from pre-war consultation. When, in 1914 or 1915, I sent an ulcer patient to a hospital during a critical stage of his complaints, he would return a few weeks afterwards to his unit with the diagnosis "gastric catarrh" "cured". Meanwhile he would feel well, the critical stage of his complaints had passed, he would think no more of his stomach and would at all events put up with slight remaining discomfort. Today, on the other hand, the positive diagnosis "ulcer" invariably arouses strong and alarming ideas. A young soldier, unconcerned before, will think his health ruined, the head of a family who had learned from some unknown sources that suffering from ulcers is wearisome and may recur at any time, that hemorrhages and dangerous complications may occur, that some assert that it often causes cancer, will become despondent and worry about his health.

If he is but of a hypochondriacal disposition, his complaints will be made worse by autosuggestion, and an injurious hypochondriacal circle will arise. Any fits of depression will also be heightened by the explicit ulcer diagnosis, particularly since it is one of the peculiarities of army medical consultations that the patient often cannot speak as freely as he will in civil life. Whatever your opinions are concerning the problems of ulcer pathogenesis, there is no doubt today that the vegetative system and its centers in the brain stem affect the function of the healthy as well as the diseased stomach psychically, motively, affectively and motorially. One of the most important functions of the control centers, of which we now know much more than before, is to contribute to an effective diversion of morbid organic processes or to bringing them back to a normal state. For psychological reasons, this normalizing function of the control centers may sometimes fail. This may delay, may even prevent healing, and above all the removal of the ulcer symptomatic crisis, which is a kind of serious vegetative disorder. The individual level of acidity in a healthy stomach is also regulated centrally, e.g. it may be changed by pervitin. The psychogenic "irritant juice" (Zuendsaft) and psychogenic vomiting of men with healthy stomachs have been known for a long time. It would be strange if the pathological stomach function could not be influenced by the center too, in a suitable as well as unsuitable way. I appeal therefore to the specialist in charge of the patient to tone down the suggestive force of the blunt organic diagnosis by an enlightening talk.

2. Contrary to the situation given in the last war, today, in peace time conditions, many or most experts agree that it is appropriate to prescribe to ulcer patients a certain precautionary diet for as long as possible, even for years. This is the point of view of v. BERGMANN, KALK MATISSON, HEINANEN and many others. I too share this opinion. An ulcer patient who has suffered from an attack in peace time is familar with that. It is obliged now to put up with army diet all of a sudden, which results in a seemingly insoluble contradiction. Voluntary breaks of the dietary will also occur in peace time, but they do not count; compulsory, involuntary ones are recorded and they will certainly come. The doctor himself is put in a difficult position by this contradiction. In my opinion, he must not take it too easy. He is often obliged to make clear this contradiction, to advise the patient how to make the best of the army diet, to grant him certain dietetic alleviations, and he must finally assert with a certain rigour that war has its own laws and is not always conducive to a man's health.

3. One more circumstance affecting the present situation of the ulcer patients results from the general judgement as to the value of men needing special diet. The general interest in problems of nutrition has justly increased considerably, involving also lack of discrimination and abuses. In any case, need of special diet is thought important and calls for sympathy. The man who has

flat feet or nasal stenosis or a narrow thorax will also have difficulties as a soldier. He will not find, however, that sympathy of which a man needing a special diet is sure today. Such judgements of value will change. During the last war, many men used to protest noisily that they had suffered a nervous breakdown. Many were all too ready to do so. Nowadays, this is but reluctantly heard or told, though the psychic strain put on men in the present war is certainly tremendous.

The result is that today the ulcer diagnoses are made more frequently, more reliably and more easily, but that questions of employing men for various duties as a whole, have become more difficult and absolutely demand the surgeon's special efforts. For this is the inference that must be drawn and not the other, viz. that we try and put the clock back by entirely giving up roentgen diagnoses and any accurate diagnosis whatsoever. One must agree with GUTZEIT who rejects in his last circular letter the suggestion made by some side or other, of refraining from roentgen-examinations of ulcer patients. And if I mentioned before that a patient with uncomplicated ulcer easily passed his crisis of complaints even when diagnosed as "stomach catarrh", this does not apply also to stomachs with grave organic changes, in particular not to ulcer cases with complications (hour-glass formations, considerable shrinkings of the lesser curvature, stenoses of the pylorus and of the duedenum, operated stomachs). By means of the X-ray examination they are ascertained much faster and are, since unfit for military service, employed in some civilian occupation. Roentgen-examinations, even repeated ones, are also useful for finding corrections and for the estimating a claimed aggravation as a result of military service. It should only be prevented that every patient is repeatedly examined by means of roenten-rays in every hospital (for many a patient passes through many hospitals). Exaggerations in this respect partly reach such a point that X-ray damage is to be feared. Nowadays, valuable material is wasted without any medical profit. Of course, it is awkward to lay down fixed rules as to how many times a patient may be examined by X-rays. I only propose, for guidance, one roentgen-examination each at the beginning and at the end of a course of treatment. Thus, with two courses of treatment per annum, altogether four X-ray examinations every 12 months may be adequate. (Findings to be entered into the paybook).

If I have particularly emphasized the psychological situation of the ulcer patient of today, it was because apart from certain rudimentary findings, roentgen-examinations alone do not provide the basis for a decision as to whether men suffering from an ulcer may be called up for military service. On the one hand surgeons knowing nothing about roentgen examinations themselves, on the other certain one-sided experts of roentgenology, are inclined to overvalue the roentgenogram for practical purposes. This must be strongly opposed. As regards the possibility of making a large number of ulcer patients fit for service that will be worth while in the majority

of cases it is not only the kind of finding that it depends on, nor only on the kind of occupation to which an ulcer patient may be assigned on the strength of his military training and other aptitudes and on the conditions given, nor only on the ability of the patient to stick it out and to avert the most serious harm which ability can and must be furthered also by the doctor's advice and particularly by the assistance of the army surgeons, nor only on a certain understanding of the superiors, - but also on an appreciation of the ulcer patient's personality. It is important to ascertain whether he is afflicted with, or constantly troubled by an ulcer, whether instincts of self-protection and hypochondriacal fear for his health are stronger than the will and endeavour to do his duty in war, to stick it through out of a sense of duty and comradeship and how and by what means the personal attitude of the individual can be influenced.

This appreciation and the attempt to exert some influence cannot always be realized very quickly. Even if one is against long stays at hospitals - which we all are - it must be admitted that an appreciation like that just demanded by me cannot always be adequately realized within 5 days - as desired in the directions - particularly not if, for instance, large numbers of men suffering from intestinal trouble are simultaneously sent to a special ward for stomach diseases or stomach observation. Cases, in which rudimentary findings of complications do not establish the patient as unfit for military service from the start, will require for a proper judgement first an attempt at therapeutics and the observation of the patient during his treatment.

Nor should I like you to assume that, in comparison with psychological appreciation, I think little of the findings. Apart from the complications mentioned, to which frequent bleedings and violent participation of the pancreas may be added as not ascertainable by roentgen rays, it is certain that besides the morphological pathology the functional pathology of these patients is of enormous importance. The extent of an ulcer site is no criterion of its capacity of involution. The latter will only result from a therapeutic trial. Even moderate stenoses may be amazingly capable of involution, at least as regards their functional effect, since the time of evacuation can be normalized. Moreover, above all, the character of recurrences, the crises of complaints, which certainly cannot be understood by the morphological stomach findings alone, are of decisive importance. With not a few ulcer patients the crisis of complaints will set in as controlled by destiny, as it were, rhythmically, partly seasonally. We do not yet understand why this should be so, but we know that it is. With some patients the crisis of complaints will set in even during a limited diet and without particular outward or inward strain. Others are manifestly dependent on violations of diet, and again, with others, nervous or physogenic effects are the initiating factors. Troubles of this kind are not only aversion to service at the front or hypochondria (one would wrong many ulcer patients in assuming this as the description of a definite or uniform

ulcer psyche, which was discussed recently, as a caricature not borne out by real life) but also haste, great weariness, hardships of every description, excessive psychic demands must be considered. The chief thing is to recognize and to appreciate the character of the complaint crisis and the initiating factors prevailing with the individual ulcer-patient. Of course, the number of recurrences do matter, too. They may also classify a soldier as unfit for military service. On the other hand, many patients, in particular those suffering from duodenal ulcer, even with two complaint-crises a year, requiring 4 to 6 weeks of hospital treatment each time, are often excellent soldiers during the remaining 40 weeks of the year; they do not even mind the military diet; they may be considered for active service.

Others with a certain permanent sensitivity as to diet may also be retained with their units with slight dietary concessions. I tried this myself very successfully as an army surgeon during the last war and have often heard of similar cases now. As soon as a unit is at rest or in a permanent position, this is possible; during an advance, general enthusiasm also neutralizes the need for a special diet. It is remarkable how different matters are with different units as to granting slight dietary variations though the units are in the same situation. The same applies to the convalescent companies in the home country. We know the attitude of many commanding officers who wish to have to do only with healthy men, but this cannot be accomplished in a total war. Here the army surgeon must carry his point and must be really interested in problems of nutrition and diet. For this purpose he must of course know something about diet. It is often to be seen, even in hospitals, that this is not the case. Army bread, well baked handled in the right way and not too new, is by no means so harmful to the ulcer patient as is supposed over and over again. Nevertheless, there are some ulcer patients who can be kept free from complaint only by the simple measure of being allowed white bread. On the other hand, speaking of bread, it is important in what quantities it is consumed. Bread eaten plentifully or bolted which absorbs gastric juice like a sponge without being properly digested is often injurious to a man suffering from duodenal ulcer. On the other hand, it would be particularly appropriate to replace the usual morning coffee by porridge or buckwheat groats for men with intestinal trouble, which, in exchange for coffee which has no nutritive value at all, is a good extra ration for breakfast even for soldiers free of stomach trouble. I strongly recommend that such cereal groats or a soup should be provided at least for men needing special diets, if possible, in all units.

The army surgeon should also not hesitate to use small doses of atropine, which distinctly contributes, with many a patient, to keep him in a condition free from complaints, which was obtained in a hospital.

In hospitals, the dietary should again and again be carefully examined and criticized. It must not be too monotonous since this would provoke violations; it must

not be made too rich, lest a return to normal diet should lose its attraction. On the other hand, the observation of diet in the hospitals must be strictly enforced. What is the good of a diet if the patient may walk about in the town and partake of their morning pint and, on Sunday afternoon, the attentive Ladies Societies will distribute heaps of cake, including the men with stomach trouble.

Strict diet must be replaced by more generous diet while still at the hospital. Direct transition from strict limited diet to the regular army diet has many avoidable and disappointing reverses in its wake, which also discourages the patient himself. During the treatment of men suffering from stomach-troubles, prohibition of smoking is necessary and must be strictly enforced.

As the General Instructions Army Manual 209 of 1942 are excellent, not many detailed proposals need be made if only their contents were better regarded and observed!

I certainly consider bed-rest at the beginning of the treatment more important than the instructions give it credit. I have a most sincere respect for occupational therapy, but I am sure it is unsuitable during the first 4 weeks of an ulcer-treatment in a hospital. Patients with slight complaints for whom it would be suitable may remain with their units. If it possibly can be managed, ulcer treatment should be made in field- or front-hospitals, where the front spirit prevails and where there is a chance of returning to the old unit and to the old pals. In hospitals in the home country questions of unfitness for military service and of disability caused by military service are in the air, and the reserve battalion offers but little attraction. Examination with a gastroscope may be very useful in judging to what extent the whole stomach is inflamed, but is to be considered only where a doctor is available who is well versed in this technique and has some experience in evaluation.

In conclusion, I wish to declare emphatically that men without military training, in whom reliable civilian doctors ascertained grave findings and who have been suffering from recurrences for a long time, should not be drafted for initial training by any means while they are just suffering from a complaint crisis. Lastly, as regards the problem of calling up dubious cases for service and those ulcer patients whose disease is suspected of being largely neurotic, I wish to raise again the question of forming companies consisting only of men with stomach trouble and to propose that men having had some experience in attempts of that kind, should join in the discussion.

Discussion:

MARK: The procedure of taking care of men with intestinal troubles within the army corps district is generally as follows: The stomach observation hospital of every medical unit will decide, 1. whether the patient with gastro-intestinal disease should be discharged as unfit

for military service; 2. whether further treatment should be carried out in the first hospital; 3. whether the patient should be sent to the hospital for stomach diseases which two medical units have in common. For treatment in the latter hospital, usually younger soldiers, mainly with more severe vegetative dystonia but otherwise a good bearing (often not having nicotine-stained fingers), are to be taken into consideration. Because of the air situation in the West, the hospital was temporarily accommodated in a ward for slightly ill patients. The treatment consisted first in about a fortnight of bed-rest and a fortifying diet with strictly controlled prohibition of nicotine. After a fortnight, all patients except those with large stomach ulcers, began occupational therapy consisting in an hour (11 to 12 a.m.) of physical exercise (callisthenics, handball, football) with a further increase in the diet. As a rule, no aggravations were reported after the sport. From 18 October 1940 to 28 April 1943, 1037 patients with stomach trouble were discharged. About one third of these (22 per cent) were fit for service in the field while about another third was fit for garrison service at home, that is a total of 66.8 per cent were fit for military service. Of those taken ill for the first time, 42 per cent were discharged as fit for service at the front. The average duration of treatment amounted to 54 days. 211 inquiries concerning those discharged as fit for frontline service or for garrison service in the home country or in the field a year after their discharge from the hospital, showed 59 per cent fit for service without, and 33 per cent with intervening hospital treatment. Thus, approximately 92 per cent of them have remained with the Army as fit for military service. 3 per cent of the remaining 8 per cent were killed in action. This seems to prove that a sensible addition of physical therapeutics to stomach treatment answers well.

Directions concerning the possibility of calling up men suffering from ulcer for military service.

As regards the problem to what extent ulcer patients are fit for military service, the lecturers and the Consultants' Committee agreed that no simple formula can be found, owing to the many-sidedness of the course of the disease and the diversity of constitutions.

Formerly, as also in the last war, frequency of the disease was underestimated, because it was not recognized. If, besides, many have an impression, that in war its frequency and violence have somewhat increased among soldiers and civilians this is traced back to the increase of vegetative nervous troubles.

Though the concept of ulcer disease as a mere neurosis is rejected and even more the attempt recently made to describe a uniform "ulcer psyche", the vegetative and regulatory, and consequently also the psychic, influences on origin, form, course, healing, and delay of healing are thought to be very important. The psychological situation of the ulcer patient is different from that in the last war:

through the alarming term "ulcer" this diagnosis now being so positive by means of X-rays; through the instruction to always adhere to a certain diet given to the patient in peace time; through the general judgement with regard to men needing special diet. These psychological effects impairing fitness for military service must be reduced by medical enlightenment. Fitness for service depends partly on the comprehension of an influence on the patient's personality, so it also depends on the surgeon.

Also in the treatment of a symptomatic crisis which begins with a strict and careful diet, usually lasting several weeks in a hospital (in the vicinity of the front if possible) with bed-rest and atropine, prohibition of smoking and of pass-privileges for all serious cases proved necessary and is considered as being most effective. Psychological guidance, suitable occupation, later on occupational therapy, and exercise are required; the latter also because of their favorable influence on the vegetative tonus.

As soon as the symptomatic crisis has passed, many ulcer patients are fit for front-service. They are those without extensive anatomical changes of the stomach, without delayed emptying, who are not sensitive diet in the intervals between their rare symptomatic crises. Even if military service in wartime involves unfavorable influences on the ulcer disease through military diet and hard physical and psychic strain, it is not true that ulcer diseases necessarily are aggravated by military service. There are even patients who feel better in war than in peace. Others may be employed as fit for garrison service in the field or in the home country with slight concessions as to diet. Among as many units as possible, it should be enforced as the least yet very effective dietetic modification that gruel instead of coffee be allowed for breakfast. On the other hand, patients with considerable anatomical changes of the stomach ascertained by a roentogram made by an expert (hour-glass-stomach, heavy shrinking of the lesser curvature, stenosis of the pylorus or bulbus, state after a stomach operation) and those who have suffered from a perforation or severe hemorrhage or have experienced frequent symptomatic flare-up for years, should not be called up for military service. If such findings are stated after careful, medically satisfactory examinations at a hospital, including examinations by means of X-rays, these soldiers should be discharged as unfit for military service without any delay by long stays at hospitals. Exceptions may be granted: to officers, professional soldiers in particularly important positions, to skilled specialists, lastly those whose official functions permit a careful dietary.

3. Postdysenteric intestinal diseases.

Oberstabsarzt (Major, MC.) Prof. STOERMER

The percentage of postdysenteric intestinal diseases cannot be estimated even approximately. The figures are doubtless lower than those put down in the literature after the last war (up to 12 per cent).

A clinical differentiation between chronic dysentery and the proper postdysenteric diseases presents some difficulties, since the tracing of specific causative organism in chronic dysentery yields only doubtful results and the agglutination tests often fail also with postdysenteric symptoms. The opinion that chronic dysentery results directly from the acute form of the disease while postdysenteric diseases will appear after a short or long period of latency does not conform with actual findings. The complete healing of specific infection cannot be positively determined clinically, bacteriologically, or serologically. This uncertainty of differentiation supports the endeavour of many clinicians to include colitis gravis with the clinical picture of dysentery. Two types of course stand out among these postdysenteric diseases: 1. The dyspeptic (or functional) for and 2. the inflammatory form. All the numerous subdivisions made in post-war time may be placed easily in these two groups. The slight as well as the severe types of course of acute dysentery lead to extensive permanent changes of the gastric juice secretion as a kind of subacidity, more frequently of achylia. In most cases, toxic injuries may be supposed to be the chief cause while gastritis is less responsible for it. Nevertheless, in 40 per cent of the treated cases, a hypertrophic gastritis could be ascertained gastroscopically. The clinical picture of the dyspeptic form is often complicated by enteritic phases in consequence of a simultaneously changed enteric secretion, which may be termed a toxic "gastro-enteritis". A pancreas-hypercholia as an anatomical functional disorder may occur at the same time.

The most important and most lingering results of dysentery are the chronic catarrhs of the large intestine. If these catarrhs continue and the bacilli test remains negative, postdysenteric disease may be properly supposed. Localization is typical to a certain extent: the lower intestines are particularly liable to it. When the disease is protracted, however, retrograde entero-colitides will set in. Together with the dyspeptic symptoms of the stomach and of the pancreas, they complicate the varied clinical picture.

By means of rectoscopy in the first place, then by roentgen-contrast-enemata, it is possible to obtain information to a large extent concerning the inflamed part and the nature of the disease of the large intestine. Using contrast media disorders of the filling through formation of spasms are seldom observed; disorders of discharge, rapid evacuation because of increased motility and high mucus-percentage of the mucous membrane of the large intestine are more frequent; 40 per cent of the cases show

retarded evacuation because of weakness of the tonus or, on the contrary, formation of spasms. The changes of the contour vary as regards catarrhal, ulcerous, or atrophic changes of the mucous membrane.

The different varieties of postdysenteric diseases cause the multiform clinical pictures, from simple allergy of the intestines or uncomplicated dyspepsia to ulcerous colitis, as well as the mixed forms; a healing of defects results but very rarely in strictures and stenoses. Hemorrhage of the intestines and perforations also occur rarely.

Examination by X-rays reveals a duodenal or gastric ulcer in a remarkably high percentage of these postdysenteric disorders. Amongst our own patients 33 per cent were afflicted with ulcer. In the search for the ultimate causes of these findings, toxaemic envolvement of the organs is not likely to give a satisfactory explanation of the way in which the disorders originate. The assumption of the same cause for all the seemingly different manifestations of postdysenteric diseases suggests a decisive influence of constitutional factors. This is confirmed by constant signs of hypersensitivity of the parasympathicus.

The question of the prognosis of these postdysenteric disorders cannot yet be answered satisfactorily, considering the brief span of the present war. The progress of the postdisenteric diseases is generally very violent. The concept of healing must be estimated with great caution. Relapses are frequent, serious general injuries are always possible in the progress of the chronic toxin effect.

During symptomatic treatment, diet treatment must be considered first. The value of an apple-diet has been proven also with these postdysenteric diseases. More heed should be paid to the frequent use of milk-casein and to the bactericidal effect of yoghurt (fermented milk).

Specific therapeutics have failed, on the whole. Medicinal therapeutics should not emphasize astringents and adsorbents too much. The sulfonamides have proved particularly efficient during these postdysenteric diseases. Enterovioform, too, seems to have a favorable influence as a disinfectant. One may try using mutaflor against dysbacteriosis. Torantil has no effect. Injections of Progynon resulted in subjective improvement. Therapy with the cortex of the suprarenal glands appears appropriate, particularly with cachectic patients. Vitamin therapy as well as transfusion of blood answer the purpose of substitution and alterative therapy. Local therapy must consider that the inflamed mucous membrane is a most delicate organ reacting to every strong stimulant with spastic contraction. Small retention enemas, however, have a favorable effect. Bathing of the intestines has proved efficacious beyond expectation. They seem to create better resorption conditions in the large intestine. As regards surgical treatment, no sufficient personal experience has been available as yet.

Discussion:

HOFF: A large number of the postdysenteric intestinal disorders are the consequence of an unreasonable diet consisting of a monotonous pap-diet, continued too long. Thus it frequently happens that famine-conditions arise with famine-diarrhea, desiccation or edemas. In the case of postdysenteric diarrhea, first a treatment similar to that of acute dysentery with castor oil and tea for two days is suitable, then a rapid progress to a diet containing calories and vitamins. Achyloses and disorders of the external pancreatic secretion are very important amongst postdysenteric intestinal disorders. In this case hydrochloric acid, such as Encynorm and ferment compounds such as Pancreon, Combicym and Festal will prove efficient. Sodium chloride treatment, the great importance of which I already pointed out at the beginning of the Polish campaign, is recommended here once more, but only for such cases as are actually desiccated and deficient in sodium chloride. In cases of edemas, this therapy is of course contra-indicated. I should like, in particular, to point out a symptom not rarely remaining after dysentery, the "hydrant-stools". Men, who may otherwise feel quite well, are in this case attacked by sudden watery defecations at certain periods. Against this disorder a drug which has proved efficient for me, for the knowledge of which I am indebted to the homeopathic doctor STIEGELE. This is podophyllin D 4, three times 5 drops per day, each to be taken 15 minutes before meals. Though I generally do not hold with homeopathy, I recommend this drug because of favorable personal experience, following the principle that, in therapeutics, the good should be taken wherever it is found. At times, we also successfully combined podophyllin with Allisatin, a garlic-carbon preparation. The ulcerous postdysenteric intestinal disorders occupy an exceptional position. Here the attempt at alterative therapy is appropriate. If autovaccine is recommended today, it is, in my opinion, because of non-specific alterative effect that is of importance. For the same purpose, transfusions of blood are enthusiastically recommended. Even a fever treatment, such as by Pyrifer, may have excellent results with ulcerous postdysenteric colitis.

BECKMANN: In Military District V, cases of chronic dysentery and postdysenteric disorders are sent to a special hospital with a particular possibility of a careful diet. (Reservehospital Gundelsheim). Dietetic treatment is decisive. Sulfonamides also prove effective, even if no genuine recurrence is involved. Alterative therapy, e.g. with Sufrogel, has satisfactory results with pyknics, but fails with leptosomes. Luicym and Combicym are desirable.

Directions concerning postdysenteric intestinal disorders.

The frequency of bacillary dysentery in the past phases of the war resulted in an increased number of cases of postdysenteric colonic disorders. It is difficult to differentiate these postdysenteric disorders from chronic dysentery, since the cessation of specific infection can be

positively ascertained neither clinically nor bacterioligically nor serologically. All parts of the intestinal tract may be involved in these postdysenteric disorders owing to a functional disorder of the digestive glands or an inflammatory change of the mucous membrane. As cause of the origin of these symptoms a toxic injury by dysentery toxin must be chiefly considered, while primary invasion of germs exciting dysentery is less important.

In the clinical picture, two forms of progress stand out:

1. The dyspeptic (functional) form, mainly due to disorders of the digestive glands;

2. The inflammatory form, affecting chiefly the colon, but which may also affect all other intestinal parts. The pure forms of these basic types are rare, their mingling is more frequent.

Clinical manifestations of the postdysenteric diseases:

a. A high percentage of the slight as well as the serious cases of dysentery result in permanent changes of gastric juice secretion or hypacidity, more frequently of a histamine-refractory achylia. These disorders of secretion are often connected with a pancreas-hypocholia and with a disorder of the intestinal glands, changed in the same way. The often (40 per cent) existing gastritis and the frequent catarrhal involvement of the small intestine results in the picture of toxic "gastro-enteritis", which need not differ from the other etiology. The acid intestinal catarrh of fermentation is more frequent than putrescent dyspepsia.

b. The most important and most lasting consequences of dysentery are the chronic catarrh of the large intestine, the localization of which is typical to a certain degree; the lower intestinal parts are chiefly affected. Attendant or retrogressive entero-colitides are, however, frequent. Obstipation (spastic irritation) is clinically often replaced by diarrhea, which may be of a more or less inflammatory character in the stool picture. Rectoscopy is as important as the contour outline shown by means of roentgen-contrast-enema, in order to ascertain the extent of the disease of the large intestine and to differentiate catarrhal, ulcerous, and atrophic changes of the mucous membrane.

c. With a certain number of patients, clinial examination reveals duodenal or gastric ulcer, which may be relatively recent.

For all these seemingly different manifestations of disease the decisive influence of the same constitutional factors must be supposed above all (vegetative, neurodysergia, lymphatism).

In stating a prognosis, the persistent course of these postdysenteric disorders must at least be emphasized. Any opinion concerning "healing" must be estimated with great caution. Relapses through unsuitable diet are frequent, structures and stenoses as well as hemorrhages and perforations, are rare. A pernicious anemia may occur.

The best prophylaxis is a thorough treatment of the acute dysentery with injections of massive doses of sulfonamides, even if disorders of the gastric secretion can probably not always be avoided.

As regards <u>therapy</u>, dietetic treatment is to be considered most. The value of the apple-diet has been proven also in the case of dysenteric disorders. The frequent use of milk-casein and the bactericidal effect of yoghurt must be taken into consideration. Hydrochloric acid (Acidolpepsin) and ferment preparations (Festal, Pancreas-Dispert, Combicym etc.) should be administered in sufficiently large doses. Specific therapy has failed. Medicinal therapy should not attach too great importance to astringents and adsorbants. Also with this groups of disorders the sulfonamides have proved particularly effective. Enteroviofform seems to have a beneficial influence too. Therapy of the cortex of the suprarenal gland are indicated particularly with cachectic patients, the same applies to vitamintherapy. The value of a blood transfusion (preserved serum) as a means of substitution and alterative therapy is unquestionable, particularly as regards the ulcerous forms. Stimulation therapy may be tried (Pyrifer, milk etc.). As to local therapy it must be taken into account that the inflammatory mucous membrane is a most delicate organ reacting with spastic contractions on any strong stimulation. Small retention enemas (olive oil, camomile-tea, dermatolgel) have a beneficial effect on catarrh of the rectum. Bathing of the intestines with a sufficient quantity of common salt, used with caution, has proved excellent. It creates favorable conditions for resorption for the large intestine. On the whole, attention must be paid to a satisfactory fluid-supply per os, in cachectic cases in the form of infusions. To reduce the intestinal tonus and to fight tenesmus, small doses of atropine and papararine will as a rule be sufficient. Opium is contra-indicated. The surgical indication of appendix-fistula, cecostomy and anus praeter naturalis is given only if all internal measures are without result. On the whole we have so little positive experience of the therapy of these disorders that it is advisable to sum up these cases under special heads.

4. Volhynia fever/

Oberstabsarzt (Major, MC.) Prof. SCHULTEN

The basis for this report is, besides my own experience, a general inquiry among the surgeons of two armies, which included a group of about 400 000 soldiers.

In the winter 1941/42 and in the first half of 1942, the disease was exceedingly frequent, up to 10 per cent of the total strength of the units being afflicted with it. This year the rate has been considerably lower so far. The reasons for this are the milder winter, the troops being less exhausted, immunization from last year, and the men's being less afflicted with lice. The last reason is certainly the most important.

The accurate number of patients cannot be ascertained; even if they consult the surgeon and are sent to medical units, the greater number of them are diagnosed erroneously at first. We even do not know which symptom complexes should be called Volhynia fever.

The most important symptoms besides headaches are attacks of fever with occasional elevations of temperature or waves of about 5 days duration and tibia aching. The elevations of temperature may occasionally be slight, in some cases, there is probably no fever at all. In other cases, a rise of temperature occurs only at first, lasting for one or two days, which then vanishes with all other symptoms of the disease. Lastly there are cases showing uniform subfebrility either from the very beginning or only in the later stages.

Besides the characteristic tibia aching, which are, however, by no means limited to the 5 days of fever, aches often set in also in the thighs, in the area below or above the elbow. In other cases, aching is felt rather in the joints or in the muscles of the limbs or of the trunk. These complaints increase mainly at night, often also during the elevation of fever, they frequently decrease when the patient moves.

The limb aches as well as the rhythmical fever may be absent in certain cases. If neither symptom exists, which is often the case, the disease is to be diagnosed merely for epidemiological reasons.

Infection most certainly is caused chiefly by lice, but it is possible that bugs occasionally spread the disease too.

The recognition of the way in which the infection occurs is rendered more difficult by our not knowing the duration of incubation. According to observations of single cases, a duration of the incubation between 6 and 50 days is probable.

It is not known why the disease should be so rare in peace time, though men may be afflicted with lice, too, and why it hardly ever afflicts Russians. A particular disposition due to age certainly does not exist, perhaps older men are infected somewhat more easily than younger ones.

It is still uncertain, whether the often existing changes of the respiratory organs and of the colon belong to the clinical picture or whether they are to be considered as special complications.

The spleen is rarely so large that it becomes palpable, but splenic dullness is often increased or the splenic region is hypersensitive.

The changes of the blood (leukocytosis, lymphocytosis, monocytosis, eosinophilia, etc.) described again and again as characteristic, are not so regular as to be of any diagnostic value.

The blood sedimentation rate is usually a little accelerated, yet normal and considerably accerlerated rates do occur.

While major neurological events occur rather seldom, slighter and transitory disorders are to be found quite frequently. In most cases they affect sensitivity (paresthesias, hyperesthesias, hypesthesias, disorders of the sensations of heat or pain, neuralgia in the ischial region or the intercostal regions) to a lesser degree motor disorders of the tendon reflexes, transitory paralyses, excessive feebleness, ataxia, changes of the tonus. Besides also symptoms of irritation and events in the sensory field (light-allergy, disorder of hearing) and vegetative changes (perspiration, vasomotor disorders, palpitation of the heart, etc.) occur. Finally, insomnia plaintiveness and slight depressions are also observed. All these changes indicate besides neuritic, central disorders in addition. They are located chiefly in the thalamus. It has even been suspected that the aching in the bones and muscles originally depend on the center.

A causal treatment has not been possible as yet; sulfonamides, atabrine, salvarsan, and quinine had no effect. Symptomatically, the usual antineuralgics as well as moist, cool poultices bring relief.

Most patients are healed in a few days or weeks. Some symptoms, such as, above all, head- and limb aches, as well as the neurological and psychic events may persist much longer. In addition to these, a very trying tachycardia will occur frequently, which is in most cases probably founded on disturbed nerve regulation. It is by no means rare that in this year, men were afflicted with Volhynia fever who also suffered from it the previous year. We do not know as yet, whether these are cases of late recurrences or were due to reinfections. The other symptoms of men suffering from Volhynia fever are often incorrectly regarded as purely psychogenic, on the other hand, they evidently may often be suppressed largely by determination.

5. Concerning epidemiology and differential diagnosis of the Volhynia fever.

Stabsarzt (Captain, MC.) Dozent K. SCHULZE

Volhynia fever is a typical epidemic disease of war. The causative agent, the rickettsia quintana, belongs to the group of the rickettsia pediculi from which it can be distinguished neither morphologically nor serologically.

The rickettsia quintana or pediculi is not only a harmless saprophyte of the louse, but may also be termed a normal parasite or symbiant of the human organism, a fact which is confirmed by its propagation and its appearance in the circulating blood of man during disorders of various descriptions.

Under conditions unknown to us, this normal apathogenic form may assume qualities causing fast spreading epidemics through the medium of the louse in passing from man to louse and from louse to man.

A useful diagnosis may be obtained only by the WERNER test, the performance of which is limited to special institutions (Research Institute for Typhus at Lemberg) because of the difficulty of keeping louse cultures available.

The experiments to facilitate the diagnosis through methods of agglutination, have yielded no useful results as yet.

It is not possible to trace the germs in the blood by means of thick smears and GIEMSA's staining method see Army Manual 209/2 # 102.

In typical cases the diagnosis is easy. Unfortunately the disease does not show a classical course with the greater number of patients, so that mistakes are quite possible.

It is precarious to trust only to the patients' statements in dubious cases, since, owing to the frequency of this disease, the complaints are better known amongst the laity than is desirable under the given circumstances. In order to prevent, beyond this, Volhynia fever from becoming a collective term like influenza, all clinical-serological and bacteriological means available must be used. Volhynia fever is often mistaken for sepsis, tuberculosis, pernicious anemia, and lymphogranuloma. Relapsing fever and malaria may also give rise to mistakes, as well as typhoid and paratyphoid diseases; also the typhoid form of tularemia should be mentioned. Russian headache fever will not last long in most cases or is accompanied, in its more serious cases, by paralyses which form no part of the clinical picture of 5 days' fever (Volhynia fever).

I have never observed that it was mistaken for socodu, the latter disease being rare. A test series has proved the usefulness of the WERNER test. With clinically entirely healthy persons who never lived in environments infected

with lice, the results were negative. With persons clinically positively ill, the rickettsia quintana could be demonstrated in every case. Sick and wounded persons who were treated for other reasons (icterus, nephritis, bullet wounds, etc.) who had lived, however, in environments heavily infected with lice for a long time, showed in 86 per cent positive results.

Continual observations showed that the negative findings were consistent. On the other hand it could be proved, however, that, up to 300 days after the disease has been overcome, the rickettsia quintana can still be demonstrated in the circulating blood.

As a result it is pointed out:

1. The necessity of a useful diagnostic method (agglutination);

2. the urgency of removing the rickettsia from the blood as quickly as possible, which, considering the mild progress of the epidemic, seems more important than the treatment itself.

Volhynia fever leaves behind no permanent immunity. It is possible to be afflicted with it several times. Experience from laboratories shows that reinfection will occur only after a long stay in environments free from lice. For this reason, one should endavour, in order to prevent a second infection, to preserve the protective or defensive mechanisms formed at the time of the clinical disease by appropriate measures, such as administering material containing quintana by inunction.

Discussion concerning Volhynia fever.

HAUER: I wish to make a short suggestion concerning therapy. In the home hospitals, Volhynia fever is a puzzle, as no therapeutic progress can be obtained. We have applied in vain the whole gamut of therapeutic remedies, which Mr. SCHULTEN mentioned just now. On the other hand we have been using gold for two months, evidently most successfully, with all our 18 patients afflicted with Volhynia fever. It is remarkable how neuralgic complaints are often reported spontaneously as alleviated even after the first injection, and how rapidly the whole state of health improves. Even patients who have been ill for a long time demand that another injection should be given them soon, as their state was so much improved. The fever seems to be influenced equally beneficially. I am sorry to say we have only early cases of the disease available. We are using aurodetoxin exclusively, starting always with the smallest dose (0.01), then increasing it gradually up to 0.1 and more. At present, we are shortening the interval of injections. It was a striking fact that some patients, even after the smallest dose, reacted with irritation of the skin, slight opalescence in the urine, and exhaustion, which is but rarely observed during the treatment of arthritis with gold-compounds

for instance. In these cases, we waited till these symptoms of irritation subsided and then continued gold-therapy. The success seems encouraging, in particular since we have had no failures as yet. For this reason, I wish to suggest a re-examination of the subject.

CRAMER: Volhynia fever takes a mild course with hardly any exceptions, and leads to no serious complications or secondary disease. My observations in the reserve hospital of Military District XX showed, above all, that it is nearly always unnecessary to evacuate the patients suffering from Volhynia fever from field or base hospitals back to home hospitals. This would only prolong the duration of hospital-treatment. Clinical healing may at least be attained in a field hospital too. As regards differential diagnosis, it must be mentioned that in the majority of cases, there is no 5 days' rhythm of the fever, but slight rises of temperature with irregular rhythm are much more frequent. If a man is suspected of having Volhynia fever, it is advisable to check his temperature at frequent intervals, as otherwise sudden changes of temperature might be overlooked. In case of Volhynia fever, slight entero-colitides with a certain rhythm will often occur, sometimes with subfebrile temperatures, as GUTZEIT too was able to ascertain during an inspection of the reserve hospitals of Military District XX. Only in few cases is the spleen palpable without doubt or enlarged to percussion. As far as my experience goes, Volhynia fever leads to no serious complications. I never was able to observe such serious cases as REUTER, for instance, describes, particularly not the cardiac complications of the form of myocarditis as described by him. In more than 300 cases, only in one case could signs of myocarditis be ascertained clinically or in the electrocardiogram. Cases sent to me diagnosed as Volhynia fever and field-nephritis particularly from base hospitals have been increasing recently. Only in two cases could a field nephritis be positively ascertained, in the other two cases, a febrile albuminuria or infectious-toxic influences were involved, sometimes with slight cylindruria and an increased number of erythrocytes. These symptoms on the part of the kidneys subsided with no specific measures being taken in the first few days. In these cases no increase of urinary substances or a derangement of the renal function were ever ascertained.

As regards the treatment of Volhynia fever, I wish to state that one can manage with very few medicaments. To alleviate the pain, pyramidon or novalgin (preferably intravenously) may be used after subsidence of the acute stage. Early getting out of bed and treatment with baths followed by active exercise as soon as possible. The neuralgiform pain is by no means increased by getting out of bed, in most cases it is even alleviated. At the suggestion of GUTZEIT, I have been consistently making my convalescent patients do exercises for some time in the form of cross-country marches, which has yielded excellent results. Above all, it shows what one can expect from a convalescent by that time, and how far he will be fit for service after his hospital treatment. Careful observation and strict medical control go without saying. Mr. SCHULTEN mentioned that the term "Volhynia fever" is, strictly

speaking, not justified at all and that, for this reason, he considered the term "Neuralgic fever" equally justified for the time being. I am of the same opinion, since the complaints of Volhynia fever are actually localized in the nervous system with hardly any exception, in the form of neuralgias (intercostal neuralgias, ischialgias, etc.) and genuine neuritides. I saw myself two neuritides of the arm-plexus with Volhynia fever with pareses and a neuritis of the left ischiac nerve, also twice a pareses fasciales (unilateral). In no case could I observe any symptoms of encephalitis.

SCHULTEN: Hardly any differential diagnosis is so difficult as that between Volhynia fever and internal tularemia, which in our region practically occurs only as thoracic tularemia. Though I observed some100 cases of both diseases, I cannot help stating again and again that to discriminate between them in any single case may be difficult or at first impossible. Common to both states are a sudden onset with fever and violent aches in the forehead and the head, exhaustion, weakness, aches in the back and limbs, heart-complaints during reconvalescence. Also the gnawing tibia pains which we once thought characteristic of Volhynia fever, occur in the same form with tularemia. In most cases of this disease, there will be additional coughing and aches behind the sternum after a few days. But Volhynia fever, too, is not rarely accompanied by pain in the chest, the trouble occurring now more in the muscles, now more in the heart. If a roentgen apparatus is available, swellings of the hilus glands with the characteristic radiation of dark streaks in one lobe of the lungs can be ascertained in the case of thoracic tularemia. In the case of tularemia, the fever will continue high longer and more continuously, as a rule, but any other types of fever, 5 days' rhythm included, may also occur. As a matter of course in this differential diagnosis the specific skin and serum reactions for tularemia must always be used. But two to three weeks will often elapse before a clear positive result is available. It will remain a biologic puzzle why two diseases due to entirely different agents and evidently also vastly different pathogenetically may produce clinical pictures resembling each other so extraordinarily as is the case here. The wrong diagnosis of field nephritis in the case of Volhynia fever is obviously due to a coincidence of albuminuria, back aches, and the mask-like face (though without proper edema).

Information leaflet.

The Volhynia fever.

The Volhynia fever (known also as 5 day fever, trench fever or neuralgic fever, WERNER-HIS-disease) is a disease usually distinguished by periodical fever and chills and a neuralgic rheumatic syndrome, which in World War I occurred frequently first at the Eastern front and has been examined more closely since that time.

Causative agent: The agent is the Rickettsia Volhynica sive quintana. It lives as a parasite in the louse and grows exclusively on the surface of the epithelium, not like the rickettsia prowazeki, the agent of typhus, which grows within the cells. A direct microscopic proof of its presence in the circulating blood has not yet been possible, even inddirect proof can be obtained only by means of the WERNER test. The WERNER test consists of having healthy lice suck blood from persons suspected of the disease and in tracing the rickettsia in the intestines of the louse after about 1 week. The carrying out of this measure is limited to special institutions and therefore is immaterial for practical purposes. A practically useful serological proof of Volhynia fever has not yet been developed; for this reason it is no use sending blood test to hygienic bacteriologic testing-stations for a diagnosis of Volhynia fever. For scientific purposes, an agglutination test of rickettsias is made in the Institute for the Research of Typhus and Virus Infections at 45 Siegfriedstrasse, Lemberg.

Epidemiology: Typically a war disease. Practically the only carrier is the louse. Infection through men will not occur apart from blood transfusion. The disease leaves behind no permanent immunity. By its tendency to spread epidemically, the tactical preparedness of the troops may be considerably impaired. The spread depends on the degree of the infestation by lice, the climax of the disease-curve therefore generally lies in the colder season.

The period of incubation varies from 4 to 60 days.

Clinical picture and course: Extremely changeable. The following kinds of courses of the fever are observed:

1. 5 days' fever (rises of temperature lasting less than 36 hours, alternating with 4 to 6 days free from fever. The fever curves may be so low that they scarcely exceed the normal, and so brief that they are not observed if the temperature is measured only twice a day (about 30 per cent of the cases).

2. Undulant fever in a rhythm of approximately 1 we

3. Uniform subfebrility often lasting several weeks

4. Brief, continued fever usually not very high, without other symptoms of typhoid, the term "typhoid" being inappropriate for this reason.

5. Brief rise of temperature (abortive form).

6. Combinations of the different types of fever are possible.

Arranged according to their frequency, there are the following complaints: headaches, particularly above the eyes, neuralgic pain in the limbs especially in the lower extremities, above all in the legs below the knee, often

felt as gnawing pain within the tibiae, often in the thighs, lower arms, arms above the elbows as well as in the joints. No objective changes are to be found in the aching parts. Contrary to other diseases of the joints there are, above all, no hematomas, and the pain will be alleviated by moving. The pain increases mostly at night, often with rising temperature. There are frequent back-aches, aches at the costal arch and in the stomach, which may cause the erroneous diagnosis of appendicitis or nethrolithiasis.

Comparatively frequent are slight and transitory neurologic affections particularly of the reversible kind (paresthesias, hyper- and hypaesthetic zones, disorders of the sensation of cold and pain, independent of the distribution of peripheral nerves).

Rarer are disorders in the motor field, reflex-disorders, transitory paralyses, (occasionally are also observed: defective hearing, photophobia, aphasia). Psychically, the patients are occasionally changed, showing a certain plaintiveness with fits of depression.

The spleen is sometimes palpable, often enlarged to percussion and sensitive to pressure in most cases.

The blood picture is of no use for a differential diagnosis, a leukocytosis, monocytosis and eosinophilia are often observed, in very rare cases also a moderate anemia.

The sedimentation rate is slightly accelerated in most cases.

In the beginning often a certain bradycardia, which, in its course, will often turn suddenly into a persistent and pernicious tachycardia, impairing the patient's efficiency to a certain degree. Serious disorders of the circulation and of the heart, or electrocardiographic changes are rarely observed.

Exanthemas resembling typhus are seldom observed. Heavy perspiration is often seen.

Catarrhal complaints do not belong to the clinical picture of Volhynia fever.

Clinical course: Most cases are completely healed within a few weeks. In some cases, the clinical picture is protracted through months with long intervals free from symptoms.

Differential diagnosis:

1. Recurrent fever and malaria are to be distinguished by the microscopic findings.

2. Typhoid, paratyphoid, BANG's disease, and tularemia are to be differentiated by the clinical course and agglutination tests.

3. Influenza: this disease usually shows more symptoms connected with the respiratory tract, which are missing in the case of Volhynia fever.

4. Particularly in the cases taking a subfebrile course, one must suppose tuberculosis, sepsis, lingering endocarditis, and lymphogranuloma.

5. In the case of the so-called Russian headache fever, headaches are usually more violent. Other symptoms, especially pains in the limbs do not occur in this case.

Treatment: Symptomatically antineuralgics; in particular, novalgin administered intramuscularly or intravenously yielded occasionally favorable results. Antipyretics yield generally no effect. Of no use are the sulfonamides known as yet, quinine, atabrine, and neosalvarsan.

Preventive measures and prophylaxis: The disease will set in the more frequently the greater the plague of lice; delousing will prevent it. As regards the necessary measures consult Army Manual 194 (Regulations for Decontamination and Sterilization), 209/XIX information leaflet on the possibilities of delousing, 209/2 # 100 information leaflet on typhus and "Army Hygiene in Winter" (only for the use of the Armed Forces).

6. Concerning Rickettsias - Demonstration in the blood and in the cerebrospinal fluid in case of Volhynia fever (V. F.)

Stabsarzt (Captain, MC.) UNGER

Considering the most varied clinical picture of Volhynia fever, it is often difficult to establish a diagnosis even clinically. The surgeon who knows the different types and symptoms of the disease will often diagnose it as such with high probability after a short observation. But even he will endavour again and again to verify the diagnosis by a distinct method of examination. As a matter of fact, such methods do exist. Thus, the serological proof by agglutination is possible, for which the use of cultures of rickettsia volhynica are required. Pursuant to another method, lice are planted on the patient, in the stomachs of which the agents can be traced after a couple of days. Both methods of examination, however, can be carried out only in special institutions and are not generally available.

On the alert for another method, there were several times discovered in the literature (both in that of the first World War and that of the second) statements purporting that, in the blood of Volhynia fever patients, there were observed forms appearing as tiny double balls,

which were pointed out as findings characteristic of Volhynia fever and considered as the agents. Other authorities, however, refuse to acknowledge these elements as specific, arguing that it is impossible to distinguish them from small grains of other origin.

In order to verify these observations, we have been doing large-scale systematic research work since August 1942, on the strength of which we are now in a position to assert that rickettsiae can be positively traced direct microscopically both in the blood and in the cerebrospinal fluid. Analyzing thousands of "thick smears" and streak preparations of the blood of patients whose clinical symptoms made one suspect Volhynia fever, in more than 600 preparations there we found elements showing the peculiar manifold forms of the rickettsiae as described and illustrated by DA ROCHA LIMA and particularly strikingly by SIKORA in the treatise "Facts concerning morphology of the rickettsiae".

It is the very multiformity of rickettsiae which may have made other authorities doubt whether it is possible to judge blood-preparations correctly. Besides, if the "thick smear" prepared as usual is stained according to GIEMSA, many grain-like forms produced by decomposition are to be found resembling sometimes certain forms of rickettsiae. The aim of our research work, therefore, was to reduce this source of faulty diagnosis to a minimum. For this purpose, it is necessary to lay this so-called "thick smear" as thinly as possible on the preparation slide in order to render it more transparent. But even more important is the staining. After trying several methods we now use the CASTANEDA-technique. For the purpose in question the original composition is not suitable, since the "thick smear" will often peel off like varnish. If the modified staining method is used, however, the preparation will adhere satisfactorily and provide a picture considerably more clear than staining according to GIEMSA. The non-specific tiny grains etc. obstructing the view of the field of vision are absent nearly altogether. On a red background the rickettsiae appear in color varying from reddish violet to black-blue, and are set off to advantage against their surroundings.

As regards the shape of rickettsiae, they chiefly appear as forms resembling diplococci, if the preparations are looked at casually. On closer examination, however, all forms caused by processes of propagation, as described by SIKORA, were ascertained. They are isolated grains, small sticks, little barrels, dumb-bell-forms, little rods with several grains of chromatin; a chain-like arrangement of the single types was also repeatedly observed. In the blood streak-preparation, it can be observed that the forms are extracellular; some isolated instances are found within the border of an erythrocyte and these are obviously accumulations. Particulars concerning the ascertained rickettsia forms cannot be discussed here; it is necessary to examine them under the microscope.

Examinations have been made in about 300 cases of Volhynia fever so far; rickettsiae were ascertained in almost each of them, though it was necessary in many cases to draw blood several times and to scrutinize the preparations thoroughly (as in the examination of Tb-sputum). It is remarkable that with some patients the rickettsiae appeared only after doses of eubasin had been administered (with which, by the way, we observed no therapeutic success in any other respect) and then in vast numbers and with considerable differences of size. Even after the fever and the other symptoms of the disease have subsided, they may still be occasionally found.

Recently, rickettsiae could be repeatedly traced also in the cerebrospinal fluid of men suffering from Volhynia fever. Though the blood-preparations provided positive findings, the rickettsiae can be observed particularly distinctly in their multiformity, owing to the light background of the preparation in the sediment of the fluid, which was examined immediately after being drawn. The fluid in which vast numbers of rickettsiae could be ascertained in most cases, showed no protein reaction and no or only slight increase of the cells; the cultures on ordinary media remained sterile.

In conclusion, the speaker mentions that, also in a case of typhus, particularly large numbers of rickettsiae could be detected in the spinal fluid.

Discussion:

K. SCHULZE: These findings were reported as early as 1916 by JUNGMANN, KUSCHINSKI and TOEPFER, but they were disproved afterwards and considered as misinterpretations, particularly by the treatises of DA ROCHA LIMA.

No therapeutic effects freeing the blood quickly from rickettsiae could be obtained either by quinine or atabrine, plasmochin, sulfonamides or by convalescents' serum.

EYER: Pathogenetic rickettsiae for humans do exist in the blood, since they may be traced in it by tests on animals. As experience has shown, their concentration in the blood is slight; conditions do not differ at all from those of other infectious diseases, which are never ascertained directly but rather indirectly by cultures. Certain as it is that rickettsiae can be traced in the blood, particularly in the leukocyte-sediment, occasionally also by staining, the method as a whole is uncertain, owing to the irregularity of the findings on the one hand and the uncharacteristic morphology caused by strong sym[illegible] of involution, on the other hand. So it may be gathered that, though certain forms may occasionally be observed [illegible] the blood preparation, which might even resemble rickett[illegible] such grain-findings, which were well-known already to ROCHA LIMA, must not be made the starting point for forming a diagnosis, since they may be interpreted in many ways.

Conjointly with Prof. NAUCK, Hamburg, I have examined some microscopic preparations submitted by UNGER, but could not convince myself that the forms represented with modified CASTANEDA-staining were actually rickettsiae. Neither in form nor in size did they resemble genuine rickettsiae; I think it less important, whether such forms traceable in the blood or fluid are at times actually rickettsiae or not, but it is a fact of practical importance that a reliable diagnosis cannot be formed on the strength of stained blood- or fluid preparations in any case.

7. Experience with typhoid and paratyphoid.

Oberstabsarzt (Major, MC.) Prof. WESTPHAL

A typhus epidemic of moderate seriousness is reported on, which reigned approximately from September to December 1942 among the 6th Army in the region of the bend of the Don and in the wedge of attack towards the Volga at Stalingrad.

Paratyphoid B there amounted to 10 per cent, paratyphoid A was less frequent. Infection occurred in many places, probably starting from carriers of bacilli among the Russian civilian population, transmitted by the close contact with them and, owing to the scanty water-supply in the steppe. Within the Stalingrad area, typhus occurred only on a small scale. On the whole, scarcely 1 per cent of the Army, approximately, were afflicted with it.

In the overwhelming majority of cases, men regularly vaccinated were afflicted with typhoid. These cases partl- took a graver course than typhoid among the vaccinated soldiers in the first World War. Only with one fourth of the patients was the clinical picture a light one, with one half it was moderately serious and with the last fourth it was quite serious. At the hospitals for serious cases mortality averaged about 10 per cent among all the patients, including the light cases and the often unrecognized cases, 5 to 6 per cent. The following complications were frequent:

In most cases the diagnosis was not difficult, because of the well-known symptoms, even the diazo reaction was in 75 per cent of the cases positive in spite of previous vaccination. The examination for leukopenia and anisinophil was particularly advantageous to a quick establishment of the diagnosis. For external reasons, the bacteriological diagnosis could be established only to a certain degree. Here the safest method was a tracing of the typhus-bacilli in the blood or in the cystic bile. The difficulties in interpreting the GRUBER-WIDAL-reaction after previous vaccination and if other infectious diseases existed are described. The frequency of mixed infections with dysentery or diphtheria and the infrequent infections in the hospit- are pointed out.

Both general and medicinal therapy are discussed, and, finally the question is raised, whether this relative accumulation of typhoid among vaccinated persons in the steppe-regions of southeastern European Russia may be caused by particularly toxic strains of bacilli which possibly might be suitable also for the production of a vaccine affording better protection in those regions.

8. Experience with typhoid and paratyphoid, particularly their course in "immunized" individuals.

Stabsarzt (Captain, MC.) Prof. SCHOENE.

The experience, on which my report is based, is founded on observations made in a region of the Eastern Front, which is situated to the west of the large bend of the Don and to the south of the lower Don and Sal, where typhoid is endemic amongst the civilian population.

In the latter part of summer and fall of 1942, no particular accumulation among the Russian population could be ascertained except in an endemic area in the district around Schutow on the railway-line Salsk-Stalingrad. A medical officer with a small detachment was ordered there by the 4th Armoured Army to localize it. On the other hand typhoid had been gradually increasing among the troops since the latter part of the summer of 1942. Most cases appeared sporadically in the single units. Slight endemic outbreaks were observed among a repair company on the lower Don with 5 cases, among an assault boat detachment on the southern railway-line outside of Stalingrad with 22 cases, among a field training regiment at Tschoretz and among the personnel of the D.C.G.S.-section of Army Group Don with 14 patients. The latter belonged to the group of paratyphoid B. A serious epidemic set in among the Labor Service at Millerowo; of the section numbering about 170 men, 78 were afflicted with typhoid.

As regards the source of infection, nothing positive could be ascertained in the individual cases. In the case of the smaller epidemics among the Staff Don, paratyphoid B bacilli were eventually cultured from the tap-water of the billets and from the water of the river Don, but no increased incidence of paratyphoid B in the city of Rostow was observed later on. Among the Labor Service section of Rostow K 1/210 at Millerowo, conditions were quite different; consumption of raw skimmed milk had probably caused the infection there. An inspection of the local dairy showed that the Russian civilian population, who as you know, keep a cow per family, delivered the milk in small quantities in a vessel chosen by themselves, such as a pot or a bottle, even a jug. All these single quantities were poured into a large tub, the contents of which were subsequently churned. If you had seen the state of the bottle

brought along and the filthiness of the deliverers of that milk you would be convinced that that milk poured together contained masses of germs of every description. There could be no doubt about it that both the skimmed milk and the butter contained all sorts of germs, including typhoid and paratyphoid bacilli. Only at very few large dairies in this region was the milk pasteurized before it was churned. At the small dairies in the open country, the hygienic conditions were sometimes even worse. I ascribe the appearance, even the sporadic cases of typhoid and paratyphoid among our troops, largely to the consumption of raw butter, which was a welcome additional ration, considering the difficulties of supply. For the rest, the troops were so disciplined hygienically that they scarcely consumed raw liquids and the milk-epidemics among the Labor Service, therefore, happened but once.

Before entering into particulars of symptomatology and progress, I must of course point out the evident fact, that all our observations, apart from one tragic exception known to me, concern vaccinated persons. This exceptional case was a female technical assistant of a field laboratory, who had never been vaccinated before, was afflicted with typhoid in September 1942 and died after a long illness. In the autopsy 7 intestinal perforations could be demonstrat

Owing to the experience gained in the first World War, the number and also the gravity of typhoid cases are, as you know, said to have positively decreased after vaccinatio had been introduced. SCHOTTMUELLER discusses, therefore, typhoid of the "vaccinated persons" only in a small chapter of the 2nd edition of the Manual for Internists. In the 3rd edition of the same manual, STAEHELIN discusses the same subject womewhat more reservedly. Our experience founded on the observation of about 2000 cases is a twofold one.

As regards the problem of susceptibility to typhoid infection, the above mentioned milk-epidemic among the Labor Service section who had been "immunized" for the first time 6 months before with a morbidity of about 40 per cent, might be interpreted as proving that there is no practical difference from other kinds of typhoid infections in peace time, e.g. by ice-cream with a sick rate from 25 to 35 per cent. On the other hand, the more common sporadic occurence of typhoid in that infested region suggests that, among non-immunized troops, major or minor epidemics caused by the consumption of other food stuffs, should have set in more frequently. After consumption of the equally infected butter, for instance, not one epidemic was observed. For this reason, the assumption seems justified that, owing to immu- ation, the typhoid bacilli are unable to get a foothold in the body. Only in case of ingestion of massive doses or strong virulence of the agents will the infection occur. A third factor also plays an important part in the origin of the disease, viz. the lowered power of individual resistance, which favors the susceptibility to the infection. It is this very lowering of the capacity of resistence that seems to be chiefly responsible for the outbreak and progress of the typhoid epidemics among the RAD (Labor Service).

In the vast majority of typhoid cases, the course was perfectly classical. The temperature rising gradually, sometimes rapidly, with subsequent continued fever lasting a fortnight on the average, was very characteristic, compared with a relative bradycardia of about 90; a look at the fever-curve was often sufficient to establish a diagnosis. The spleen was swollen in almost every case. Eruption of roseolae could be observed in just as many cases as in peace time, viz. in about three fourths, certainly not only in a fifth, as HIRSCH asserts for immunized persons during the last war. Diazo reaction also was positive in about 70 to 80 per cent of the cases, as compared to 20 per cent in the last war. Subjectively, the patients particularly complained of headaches, rheumatism, and a certain numbness; in the critical stage of the disease, the latter would increase to a somnolence lasting for days or weeks.

The eosinophilic leukocytes, which were almost regularly found in 1 to 3 per cent of the cases even during the initial stage of the disease, behaved in no regular way. On the other hand, the reduction of the number of leukocytes, at first normal, to values of leukopenia down to 3000, with attendent relative lymphocytosis proved a fairly constant symptom of diagnostic value. Even in case of rather extensive broncho-pneumonic processes, the number of the white blood corpuscles seldom exceeded 10 000; only a shifting to the left could then be ascertained besides the lymphocytosis. In serious cases, anemia would develop as a rule sometimes attaining haemoglobin-values as low as to 40 per cent. In one case the picture of anaplastic anemia was observed.

Here also the complications were chiefly inflammation of the respiratory organs. In most cases the patients were admitted to the hospital with a tracheitis or a bronchitis. Additional broncho-pneumonic foci sometimes overlapped so much that the impression of a labor pneumonia arose clinically which caused diagnostic mistakes. Persistent hoarseness often gave rise to the suspicion of a perichondritis laryngea. While the bones, and also the kidneys and the urinary tract were but rarely affected, we occasionally observed changes in the neurologic findings; sometimes during the initial stage of the disease, the absence of epigastric reflexes, unilaterally intensified patellar reflexes and at times even a positive Babinski, probably as a symptom of a spinal meningitis, could be ascertained. As regards form and frequency, the cerebral symptoms correspond to the descriptions in the text-books.

A remarkable fact deserving to be particularly emphasized is that intestinal hemorrhages occurred but very rarely; though this statement refers only to macroscopic proof, but it tallies with the autopsy findings, which revealed large tumors or perforations only in exceptional cases. Among 50 men of the Labor Service affected by the disease in the Millerowo epidemic the stool of only two contained blood.

The frequency of recurrences fell by no means short of the peace time rate; if the latter is stated by CURSCHMANN to be from 6 to 12 per cent, war time cases exceed this figure by many times, rising to 20 to 30 per cent in our district. At times, the continued fever dropped to subfebrile temperatures for 1 to 2 days, with a fever wave almost as high and as long following immediately. This so-called supplement differed from the genuine recurrence as follows: In case of the latter, after a longer interval free from fever, all symptoms of the disease may recur with the rise of temperature, such as enlargement of the spleen, positive diazo test, roseolae etc. In many cases, the recurrences had a more serious course than the original disease. In the case of a nurse, the second recurrence, which set in after many weeks, caused the most serious clinical picture.

This frequency of recurrences of war typhoid depends probably on the special conditions in the field. Above all, transportation seems to have some influence on it. After the second week, transportation furthers the occurrence of complications, particularly of the lungs, and of recurrences, which may be attributed to the transportation may occur even 2 to 3 weeks after defervescence. Transportation is tolerated best while still in the initial stage of the disease; thus, I saw patients in the second week of illness with high fever walk from the improvised hospital train to the hospital without any serious effect on the later course observed by us.

The involvement of people of different ages approximately corresponds to peace time experience. Of 298 new patients in a hospital for infectious diseases, the proportion of the age group from 18 to 22 years was 32 per cent, but the proportion of the following 4 groups up to the age group of 40 were only 16, 14, 22 and 11 per cent respectively, though, as regards age, the troops are not composed according to this percentage. This shows that juveniles are particularly liable to the disease.

It is always difficult to form an opinion on the prognosis. Only subjectively, the impression prevailed that the seriousness of typhoid fever which occurred last year in the south of the Eastern Front did not fall short of peace time conditions; the description of the course of the disease and of the frequency of recurrences, should also have shown as much. The prognosis was particularly observed by the decrease of resistence inevitable in the field under unfavorable climatic and strategic conditions. The Labor Service sections were particularly affected by this. Thus, in the case of the Millerowo epidemic the disease took an exceedingly serious course from the very beginning. 80 per cent of the men were benumbed (lethargic), partly even delirious; somnolence continued for some weeks even after defervescence. The death rate was accordingly high; of the 78 men, 12 died, viz. 15.4 per cent. Of the 158 soldiers treated at the same hospital, only 9 died,

viz. 5.7 per cent. A similar situation occurred in the case of the 22 patients of the field training regiment # 614, who, having got safely through the advance as Labor Service men in the field, were taken over by the Armed Forces in October 1942 and fell ill in November. 5 of them died, whereas only 7 of the other 276 patients treated at the same hospital died. Among the Roumanians, who were sent to the hospitals in a state of complete exhaustion during the retreat, the death rate was equally high. On the whole, the death-rate at the single hospitals varies between 4 and 10 per cent, but these figures are of no particular use, since the patients sent to the rear medical institutions were sifted previously.

In the vast majority of the cases with fatal issue, the cause of death were pulmonary complications. Death by intestinal perforation was rare; e.g. among 5 deaths which occurred at a base hospital from June 1942 to April 1943, no perforation was observed. At another hospital for infectious diseases two perforations were found among 18 autopsies, and twice, hemorrhages were supposed to have been the cause of death.

Among the cases afflicted with paratyphoid, paratyphoid B was predemonant. In most cases, it began with diarrhea, which, in some exceptional cases, developed to such a degree that cholera had to be taken into consideration. The course of the fever was characterized partly by a brief continuous fever, partly only from the very beginning by remittent fever in the sense of a questionable disease. The other symptoms, too, had developed less pronounced than in the case of abdominal typhoid. After all, the fever-curve with attendant relative bradycardia, leukopenia, and often positive diazo reaction afforded, besides the clinical impression, sufficient clues to the diagnosis. Subjectively, the patients had hardly any complaints, the initial diarrhea excepted. No fatal case was reported to men, but the frequency of recurrences was little less than that of abdominal typhoid.

Paratyphoid A occurred more frequently than in Central Europe; its proportion of the total numbers of paratyphoid cases may be estimated at 1/4 to 1/3, approximately. As regards the gravity of the clinical picture, it was between abdominal typhoid and paratyphoid B. Its fever curve resembles more that of the former. On the other hand, diarrhea and vomiting could often be found from the onset here also. Recurrences occurred almost as frequently as with typhoid, one patient had the second recurrence after nearly three months. But here also, not one fatal case has been reported to me.

Since the diagnosis of paratyphoid cases is mainly based on bacteriological results, something may be said here about diagnoses. If STAEHELIN writes: "Today the diagnosis of typhoid will be established in the laboratory", this statement is by no means appropriate for conditions in the field, particularly not for abdominal typhoid.

I mentioned the classical course of the fever- and pulse curves, and also the pronounced signs of the other symptoms before, so that, with a few exceptions, the diagnosis could be established on the strength of the clinical picture alone. Of course, there are abortive cases where clinical symptoms may fail, such as the case of a surgeon-ensign with brief rise of temperature recurring three times and without considerable complaints; but also in this case, leukopenia of 5000 and a positive diazo test indicated typhoid disease. Broadly speaking, a bacteriological examination will bear out and specify the general clinical diagnosis of typhoid.

In this connection, it must be mentioned that the bacteriological results were seldom uniform and leave many problems unsolved. It was for instance a striking fact with paratyphoid A particularly but also with other varieties, that though bacilli had been traced in the blood or in the stool, the WIDAL reaction remained negative even after weeks. The field conditions may be responsible for the fact that tracing the bacilli in the blood was only partially successful, although SCHOTTMUELLER was already struck by it during the last war and ascribed this phenomenon to protective vaccination. The existence of a vaccinal titer and the increase of it even by non-specific infections produces a situation so that a WIDAL reaction of 1:400, made but once, is of no diagnostic value. Only the rise of it is of diagnostic importance. Hence it follows that blood must be sent in for agglutination rather frequently. So one can manage to settle many obscure cases bacteriologically, particularly if the intervals between the single analyses are not too long. We have observed that several agglutinations repeated at short intervals resulted in one high titer, whereas the WIDAL reaction was negative 4 to 5 days before and afterwards.

As regards treatment, nothing essentially new can be said. The quality of attendance is and will remain decisive. I could not completely convince myself of any excellent effect of the sulfonamides on pulmonary complications; on the contrary, it was pretty certain that if sulfonamide-therapy had no effect on an ostensible pneumonia, the latter was probably only a complication of a typhoid disease.

In summary: The susceptibility to typhoid and paratyphoid in the infected area was apparently reduced despite smaller endemic outbreaks and greater numbers of sporadic cases. Protective immunization probably manifested itself in a reduced ability of the typhoid bacilli to get a foothold. If typhoid had once set in with "immunized" persons the gravity of the clinical picture did not differ from that of peace time during the last fall. It was a remarkable fact, however, that intestinal hemorrhages were very rare and that intestinal perforations as a cause of death were ascertained only in exceptional cases. The behavior of the eosinophilic leukocytes was variable, they were hardly ever missing. The frequency of recurrences

far exceeded the peace time rate, it is probably caused by the special conditions in the field. The WIDAL reaction may be used only with a titer higher than 1:400. Since the bacilli test as well as agglutination failed in many cases, the clinical picture is still decisive for diagnosis under field conditions.

Discussion of typhoid and paratyphoid.

GUTZEIT: In the search for the causes of the degree of gravity of infectious diseases and of typhoid in particular, much more allowance must be made for the epidemiological peculiarity. The "decrease of resistence" for the serious course of a disease has become a catchword more and more. Asked in confidence what he meant by decrease of resistence, the individual surgeon certainly would often be at a loss as to what to say; every one means something different by it. During the fall of 1942, typhoid was comparatively more frequent than in the preceding year, despite the same vaccination, not only in the south but on the whole Eastern Front. In the south of the Eastern Front all epidemic diseases have for years been more numerous and the clinical pictures more serious. The causes are still largely unknown. It cannot depend on the patients' resistence. During an epidemic in Paris in 1941, the vaccination made during the period of incubation had a most beneficial effect on the gravity of the disease. Thus, no negative phase set in. This is important for future outbreaks of diseases. Stabsarzt (Captain, MC.) Prof. HOERING should report on his experience with fever-therapy.

HOERING: In the Italian, English and also German (NETOUSEK) literature, intravenous vaccine-treatment is often recommended; it has been emphasized that it is important for eventual success to bring about a shaking chill. At a base hospital in the Crimea, corresponding experiments with non-specific shock-treatment (with Pyrifer) could be made, which were completely successful (critical defervescence) with patients at every stage of typhoid in more than three fourths of 50 selected cases (demonstration of the fever-curves). For this therapy, the patients must not be too feeble. To obtain a complete effect, 2 to 3 injections with increasing doses (up to a severe chill) are sometimes necessary. Isolated recurrences will occur also with persons thus freed from fever. Even if a treatment with sulfonamides has on the whole no effect on typhoid, diarrheas in the amphibolic stage may sometimes be promptly removed by it. In earlier stages, a temporary lowering of temperature is all that may be expected from the sulfonamides.

UHLENHUT: Typhoid in Russia spread among the troops in the same way as during World War I, when infection could be traced back to the endemically infected indigenous population of Belgium and Northern France. It is particularly the bacilli carriers that are the original cause of endemic typhoid distribution and effect wider spreading through direct or indirect contact (infection of food stuffs).

During trench-war in World War I (Med. Clinic 1915,6), I thoroughly examined the indigenous population of the places behind the front for bacilli carriers, and isolated them, as we had been instructed by Robert KOCH during organized typhoid fighting in the south-west of the German Reich (assembly area!). In the course of the organized campaign against typhoid in Alsace and Lorraine, they were isolated during the mobilization. Dangerous sources of infection were eliminated in this way. But this is no radical remedy under war conditions. Unfortunately, chemotherapeutic healing of the bacilli carriers could not be managed as yet in spite of extensive research made by my and my collaborators. At the instance of His Excellency SCHJERNING, a reward of 20 000 Reichsmark had been offered even before the World War. The curing of the bacilli carriers is the beginning and the end of typhoid control. By means of chemotherapy, typhoid itself might be attacked by eliminating bacilli carriers. The same applies to paratyphoid, with which it is true, not only the patient or bacilli carrier must be taken into account as an infection source (UHLENHUT, Med. Clinic 1934, 24). The sulfonamides have had no effects as yet, whilst, in case of dysentery, remarkably beneficial results were recently obtained with Cibazol, etc. Protective vaccination against typhoid affords no absolute protection. The high virulence of the Russian strains will perhaps sometimes break through the immunity. The highest possible numbers of such highly virulent strains ought to be used for vaccine preparatien. In the bacteriological diagnosis of typhoid the (Blutgalle) blood and bile are positive in nearly 90 to 100 per cent in the fifth week. The surgeons must be reminded of that again and again, since in peace time they often were not yet properly acquainted with typhoid. Even under field conditions, the method is quite simple and decisive. Here it must be remembered that in numerous cases, typhoid cannot be safely diagnosed clinically at all, as it may take a course with the most varied clinical pictures (influenza etc.).

9. Postdiphtheritic disorders: treatment, judgement of fitness for service, later possibilities of calling up for military service.

Oberstabsarzt (Major, MC.) Prof. SCHOEN

Postdiphtheritic disorders - only these, not the acute stage of the disease will be discussed here - are practically limited to disorders of the circulation and of the nervous system, with myocarditis and polyneuritis predominant in the clinical picture. The local specifically diphtheritic changes in the respiratory tract seldom cause late postdiphtheritic diseases; the same applies to the attendant hemorrhagic symptoms of serious diphtheria, to parenchymal disorders of the liver and other organs. The suprarenal gland is perhaps affected in the acute circulation collapse of toxic diphtheria. Only diphtheritic

nephrosis may occasionally outlast acute diphtheria for a short time, sometimes combined with hematuria, owing to parenchymal bleedings. The prognosis is always favorable.

By far the most frequent and most important post-diphtheritic disease is myocarditis. Pathologico-anatomically, it is a primarily toxic injury to the myocardium with degenerative changes of the muscle fibrils (myolysis with vacuolar degeneration with deposites of hyalin), an edema with particular affinity to the conduction system and affecting large areas of the myocardium. This diffuse heart disorder chieftly affects the left ventricle, particularly the apex and the middle layer of the myocardium, accounts for the acute danger of heart failure. In its further progress, secondary perivascular and interstitial infiltrations of round cells and finally thin callouses replacing the destroyed tissue will form. Diphtheritic endocarditis with subsequent valvular defect is very rare.

The development of diphtheritic myocardial injuries can be observed only in the electro-cardiogram. Early injuries can be ascertained in the first week, at times even on the third day (derivation of the pectoral wall according to NEHB). The earlier and graver the change, the more serious will be the prognosis. If death occurs within the first two weeks it is caused by heart-failure in most cases. In order to judge the late consequences in non-fatal cases, it is necessary to follow the progress of the myocarditis closely.

As in the case of many infections, tachycardia of the sinus (irregular) will set in first, which is combined with functional disorders of the circulation (ST-deformation); these will disappear with the tachycardia. If a myocarditis develops, any injuries possible may occur, often in combinations; every part of the heart may be affected. There is no typical electrocardiogram for diphtheria. Prolongations of PQ, flattening or negativity of the secondary oscillation, ST-deformation are observed most frequently. Fluttering and fibrillation of the auricle are rare; intraventricular disorders of the conduction system, abnormal stimulation, extrasystole, change of rhythm with contraction of several stimulation-centers are often observed. Crural and branch blocks have not so unfavorable a prognosis as is often supposed; on the other hand, a complete a-v dissociation in case of bradycardia is considered unfavorable, which I could confirm in four cases. The rapid change in the electro-cardiographic picture (caused by temporary anatomical symptoms) and the possibility of complete disappearance of even grave EKG-changes are characteristic. In order to show this clearly for future judgement, I show some series of typical findings, demonstrating, at the same time, the most important changes of the electrocardiogram in case of diphtheria (demonstration).

First the usual picture of a flattening of the T-deflection with gradual retrograde change to the normal, in this case remarkably slow, since in the case of this nurse, diphtheria was diagnosed and treated only in an advanced stage. A grave case of diphtheria showed grave changes with retardation of conduction and ST-deformation, which will disappear completely in some two months, besides polyneuritis. The third case with WILSON-block had a still graver progress, later branch-block with extensive involution within one month afterwards. On the tenth day a transitory a-v dissociation was ascertained, which was overcome. After a grave failure of the circulation on the 20th day, the electrocardiogram showed considerable improvement. Another clinical picture showed a late injury with bi- and trigeminal extrasystoles. The difficulty of forming a prognosis on the basis of the electrocardiogram is shown by two fatal cases, in which days, even hours before death by heart failure occurred, the EKG showed only slight cases, and in which most serious disorders developed suddenly. In case of late injuries, such rapid aggravations are not to be expected.

The frequency of demonstrable EKG-changes depends on the gravity of the epidemic. Provided that regular control is exercised, we find them in the majority of our cases. They are predominantly slight transitory changes with flattening of T, downward deflection of ST or PQ-prolongation, which should be regarded as prognostically favorable and complete capable of involution, after the second week of illness. The time necessary for that cannot be foreseen, but is usually limited to a few weeks with absolute rest. Even our grave cases showed, with hardly any exceptions, a normal EKG again within three months.

If there are clinical symptoms of myocarditis completely absent, the judgement must be founded on the EKG. Disorders of rhythm and grave functional disorders of the circulation manifest themselves of course. Continuous control by the EKG will prevent overestimating slight deviations in the EKG, as it indicates an active process by the change of findings. It is also required for the therapeutic control, which must consist in absolute rest, if possible, till the EKG is normal. Even in the case of mild diphtheria, EKG-control is required, before the patient gets out of bed, since overlooking a myocarditis, even a slight one, - not yet completely healed - and permitting premature strain, at least impairs convalescence considerably. In this respect, nothing can match the EKG.

The temporal development of myocarditic postdiphtheritic disorders varies but is usually rapid and limited to a few weeks. Particularly the hearts of juveniles will, as a rule, recover complete functional efficiency. ROSTOSKI in Dresden followed up the fate of 1371 surviving diphtheria cases with EKG-changes, during the years 1935-1938. The majority, 55.5 per cent, showed a normal EKG again within 4 to 6 weeks. The other 611 cases showed late defects,

usually prolongation of PQ, changes of T and ST, particularly in lead 3, whose diagnostic value is partly dubious. Three years later, 19 cases (less than 4 per cent) still showed slight changes, but all were fully occupied with labor duties and were feeling well; 1 year afterwards, only 7 cases had not yet quite recovered. Only some negligible few out of vast numbers remain, as demonstrated, and even these are clinically healthy and completely fit for work.

As soon as the first few weeks are over, the prognosis of diphtheritic myocarditis is distinctly favorable, and even in case of the rarer delayed disappearance of the EKG-changes, complete recovery can nearly always be expected, even if only after many months. I have the impression that a delay of healing is still more restricted by a strict rest-cure. Remaining slight abnormalities in the electrocardiogram must of course not be overestimated; in doubtful cases the total clinical picture and cautious functional strain will decide. On the other hand, the question arises, to what degree a functional heart-disorder will remain, even if the EKG is normal. In case of immediately preceding grave disorders, this must be expected for a limited period; in case of lighter ones, the fitness for work will be ascertained by carefully regulated functional strain (UHLENBRUCK). As a rule, complete restoration will occur usually within a remarkably short time; exceptions will be found particularly in the cases of patients of advanced age, who need a comparatively long time for functional restoration.

The periphery of the circulation is comparatively rarely affected by late postdiphtheritic disorders, irregularity of blood-distribution occurs during convalescence as in other infectious diseases and disappears with systematic training. Though postdiphtheritic hypertonia was occasionally observed with children, I did not find it with adults. Nor do hypotonic disorders of regulation play any important part if the heart is sound. The most important thing is the evaluation of the heart.

As regards the evaluation by the army surgeon, the following conclusions are to be drawn:

1. The frequency of diphtheritic myocarditis requires regular control by means of the electrocardiogram even in lighter cases (at the latest before the patient first gets out of bed (3 to 4 weeks after his falling ill)). Patients suffering from myocarditis need strict bed-rest, at times for a long period. If necessary, drugs for stimulating the circulation, particularly small doses of strophántin, should be administered.

2. The vast majority of the EKG-changes as symptoms of myocarditis are slight and subside within 4 to 6 weeks after the patient has fallen ill, i.e. at the time when he is allowed to get out of bed also on the strength of the rest of the clinical course.

3. Judgement of fitness for military service after diphtheria without complications: after recovery "fit for general service" (kv) without limitation. In case of demonstrated myocarditis, a certain precaution is recommended even after clinical healing and normalized EKG.

a. Light diphtheria with slight EKG-changes and rapid recovery will result in complete fitness for general service (kv) after the end of a 4 to 6 weeks' treatment and a recuperative leave. This will be the case in the majority of cases.

b. After grave diphtheria the circulation must be strained only gradually, even after normalization of the EKG and clinical healing, and that the more cautiously, the longer the disease lasted. It is recommended to decide on "fit for garrison duty at home" (GvH) for three months, first with indoor-service, then systematic training, control by the EKG, afterwards "fit for general service (kv) if the efficiency is satisfactory.

4. A remaining change in the EKG after clinical healing, which does not disappear after about three months of hospital treatment and is connected with reduced efficiency, will according to its gravity, have to be judged as "fit for garrison duty at home" with cautious training, or better as "transitory discharge", further control within 3 to 6 months and upon disappearance redrafting as "fit for garrison duty at home", later on as "fit for general service".

5. Only very few cases who have recovered from grave diphtheria and grave myocarditis, and who have retained a permanent defect, particularly elderly men, are to be discharged from military service with or without some degree of disability. Even here, a further control after 6 to 12 months is necessary and will often render redrafting possible. It is not necessary to continue hospital treatment too long beyond the period of active myocarditis. Cures at bathing resorts for heart diseases are not recommended if the EKG-changes continue, and may be dispensed with after healing. The opinion about grave diphtheria cases is often also decided by an attendant neuritis in addition to myocarditis.

Obvious postdiphtheritic paralyses as late consequences are easy to judge. The frequent isolated pareses of the soft palate and of accommodation will disappear soon, as a rule. Extensive deglutition-paralyses with involvement of the pharynx must be treated at a hospital till they disappear, as there is danger of a deglutition pneumonia. In case of grave polyneuritis, the duration of the treatment will be chiefly decided by the peripheral paralyses.

If acute danger of a paralysis of the respiratory muscles in case of highly serious polyneuritis and the not very rare cases of LANDRY's paralysis is overcome, the prognosis of postdiphtheritic paralyses is absolutely favorable, though there are vast differences in the duration of complete healing. In the therapeutic respect, the disappearance of paralyses cannot be considerably influenced by the usual remedies though it is of some importance to stimulate the muscles by physical therapy. Whence it follows that hospital treatment has certain limits. When paralysis has disappeared so far that the patient can take care of himself, it is possible to send him to a suitable home till he recovers his full capability of motion. After disappearance of the paralyses, courses of medical treatments may be taken into consideration as transition to "garrison duty at home" in order to increase the efficiency faster by means of hygienic gymnastics and training. After a limited period, full fitness for general service will often be attained; over-exertion and influences of cold are still to be avoided for a long time.

Postdiphtheritic paralyses may set in 60 days and even later after the beginning of diphtheria. Till this period has elapsed hard exertions, soakings and injuries by cold, abuse of alcohol are to be avoided as far as possible in order to prevent it. If a light diphtheria is soon treated with serum, the danger of a polyneuritis is slight and almost negligible. This danger is considerably greater in cases where diphtheria was neither diagnosed nor treated. Serious cases will be treated long enough to render a late polyneuritis after discharge improbable; particular preventive measures are, therefore, not required.

Most important for avoiding diphtheria sequelae is an early clinical diagnosis and immediate serum-therapy in sufficient, but not excessive, doses and repeated administration of serum, as long as considerable membrane exists. The second important measure is complete rest till the acute symptoms have subsided, particularly a possibly existing myocarditis. Thus, the period of the inevitable unfitness of diphtheria patients for military service may be shortened. The disability as regards bodily injuries suffered during military service are nearly always prevented by the treatment, considering that the prognosis of the diphtheria sequelae is remarkably favorable despite the seriousness and danger in the beginning, making allowance for the fatal cases.

10. Consequences of diphtheria, treatment, and judgement of the fitness for military service.

Oberstarzt (Colonel, MC.) Prof. UHLENBRUCK

Diphtheria has always been spoken of without any exact definition of the form of diphtheria, and yet it is of the utmost importance to make a differentiation. A classification, made by ESCHERICH and improved by SECKEL, and used at the clinical hospital of KLEINSCHMIDT, is founded on the working hypothesis, that the different progress of diphtheria is strongly influenced by the reaction of the macro-organism, in particular by the state of allergy. Localized diphtheria is, in clinical respects, diphtheria locally limited to tonsils, nose, and larynx; wound diphtheria may be included in this group. It would correspond to the normal manner of reaction. Spreading diphtheria corresponds to the abnormal reaction. It may be subdivided: without croup, with croup, and with broncho-pneumonia. The third form is toxic diphtheria with an allergic reaction of the body, the symptoms of which are the susceptibility to edema and hemorrhage. Diphtheria is called pretoxic, if the edema is limited to the surroundings of the affected tonsil, with a clinical picture often much resembling peri-tonsillar abscess; toxic diphtheria of the first degree, if the edema spreads below the angle of the jaw as far as the middle of the neck; toxic diphtheria of the second degree, if the edema spreads to the clavicular cavity; toxic diphtheria of the third degree, if the edema extends beyond the clavicular cavity, often as far as the mammilla. The fatal cases with serious insufficiency of the circulation are termed hypertoxic diphtheria. Besides, this scheme should, for the records of disease, list the carriers as such. They are usually subdivided into carriers of incubation bacilli (one must be careful with this division, since an overlooked diphtheria of the nose will often be considered as an ostensible carrier of bacilli) and carriers of contact bacilli (i.e. cases with positive findings of bacilli, without being ill themselves), and into carriers of convalescence bacilli (i.e. permanent carriers). Statistics including 951 cases of SECKEL's at KLEINSCHMIDT's hospital show that this aspect of diphtheria from the working hypothesis of allergy is particularly important because of a differentiation between the non-toxic and toxic cases. Among 532 cases of localized tonsillar diphtheria, there was no case with any disorder of the circulation, no case with paralyses, no fatal case. Progressive diphtheria in the cases accompanied by croup showed 7.5 per cent disorders of the circulation, 3.5 per cent paralyses, 16.8 per cent fatal cases, all of the fatal cases being due to pneumonia. The cases without croup showed extrasystoles in about 10 per cent, 4.2 per cent paralyses, 4.2 per cent fatal cases. These figures rise rapidly in the cases of toxic diphtheria. Pretoxic diphtheria has 26 per cent disorders of the circulation, 20.8 per cent paralyses, but no fatal cases. In case of toxic diphtheria of the third degree, there occurred 97.3 per cent disorders of the circulation, 76.7 per cent paralyses, 60.3 per cent lethal cases. Though I recommend a more exact differentiation of the diphtheritic

cases based on their widely differing clinical picture and regard the above mentioned classification as the most suitable, the other point of view of the micro-organism in comparison to the reaction of the macro-organism (patient) must not be overlooked. There are serious and mild epidemics of diphtheria, and there are different opinions as to whether the type gravis, the type intermedius, and the type mitis actually do determine the serious or mild course of diphtheria. I am sorry to say that in the Mediterranean area, we were not in a position to make this differentiation. Otherwise you would think the mitis-type by far the most frequent in those countries, where, as you know, diphtheria is particularly frequent. The Airforce hospital at Athens reports among 195 cases of diphtheria only 5 per cent toxic diphtheria and no fatal cases. The hospital at Catania had only one fatal case among 167 cases, at Trappani one fatal case among 48 cases, at Ragusa no fatal case among about 20 cases, at Rome no fatal case among 13 cases. In Germany, the mortality of diphtheria epidemics at the military or civilian hospitals will amount, as a rule, to at least 4 per cent even after the serum period, occasionally it even rose to 10 per cent. Diphtheria in Greece and Italy may therefore be called extraordinarily mild in this war. Tunis seems to be a certain exception: I observed 4 fatal cases of diphtheria there within a short time. From the hospitals mentioned above the patients were discharged as fit for service after an average treatment of about 40 days.

I wish to make some remarks about the duration of the course of diphtheria. As for myocarditis, it is known to set in generally about the 8th or 9th day, the second and third weeks of the illness being the critical stage. 5 to 6 weeks later, myocarditis will disappear if it has not been fatal. One may safely say that the prognosis generally is the worse, the earlier the pathological electrocardiogram appears. I demonstrate a case (treated by Oberarzt (1st Lt., MC.) Dozent Dr. SCHAEFER), the electrocardiograms of which I was in a position to observe. It showed a positive involvement of the myocardium, as early as the second day, which did not disappear until after 6 months. The second case, too, shows an involvement of the myocardium on the fifth day which disappeared only after almost 6 months. Diphtheritic myocarditis, therefore, must be expected to last rather a long time. As regards fitness for service the classification may perhaps be formulated thus: to recover his fitness for service, the patient needs about the same time that the myocarditis took for its course according to the EKG-findings. The great danger of diphtheria in its early stage is collapse. Danger of collapse will exist during the first few days until the second week has elapsed, later on, only in case of an attendant serious myocarditis. In the case of toxic diphtheria, another critical stage with danger of collapse will set in when the patients get out of bed in the 5th or the 6th week. Tachycardia will appear from the second to the third week and it has a favorable prognosis. Here too the time when the patient is allowed to get out of bed is a second critical stage.

Frequencies of the pulse about 120 and more are frequently observed for weeks afterwards, when the patient gets out of bed. The appearance of early paralyses is during the third and fourth week. It is usually the soft palate and the accommodation that will be affected; the period of late paralyses lasts from the sixth to the ninth week. After the ninth week, the danger of paralyses may generally be regarded as overcome, even in toxic cases. If the kidney is involved in the forms of an invariably mild nephrosis, this will occur from the second to the fourth week. The bacilli findings will usually be negative during the fourth or fifth week even in serious cases, after the eighth week we speak of them as permanent carriers. A survey, which the reserve-hospital Koeln-Hohenlied was kind enough to place at my disposal, showed that among 32 cases predominantly of toxic diphtheria, which required prolonged hospitalization, in the seventh week 11 cases still had a myocardial defect, 3 cases required further treatment because of paralyses, 5 cases because of persistent positive bacilli findings, 14 cases because of postdiphtheritic lability of the circulation.

As for evaluating the irregularities of the circulation in cases of diphtheria, the electrocardiogram should be chiefly consulted since it is absolutely indispensable for an accurate diagnostic explanation. I am sorry to say that under war conditions this is very often impractical. Improvements are urgently desired in this matter. A rough diagnosis of diphtheritic myocarditis may be arrived at in many cases, it is true, from pallor, cyanosis, disposition to collapse, vomiting, enlargement of the liver, enlargement of the area of cardiac-dullness, shifting of the cardiac apex beat to the left.

Again speaking of evaluating the electrocardiogram of diphtheria patients, early disorders of auricular functions, enlargement of the auricular appendages, P-wave turning negative, change of the original place of stimulation, even auricular fibrillation have been observed. Early disorders are always myocarditic, the later ones, in my opinion, are often caused by a vegetative disorder of regulation. During states of exhaustion of aviators, I very often observed the change of the original seat of stimulation in the auricle, though there was no reason to suspect a myocardial injury. In many cases, deficient sensitivity of the vagus, allergy of the sympathicus are the causes and not a myocardial defect. Prolongation of the conduction time between auricle and ventricle is frequent and often temporary. If it persists, the EKG must be kept under control, and the patient requires careful treatment, chiefly bed-rest. If these disorders do not disappear in the course of several weeks, though the time of transition becomes normal through physical strain, the remaining myocardial defect is slight, the patient fit for garrison duty at home, in light cases even for general service. If the disorder of conduction in its early stage leads to a complete a-v block, the prognosis frequently is fatal, with the mortality of these cases exceeding 90 per cent. Femoral block and incomplete bilateral femoral block (arborization block) have a mortality

rate of 50 to 60 per cent. High doses of atropine with small doses of strophantin proved most efficacious in those cases. W-block and M-block will occur, also a change of the block from a left block to a right block and vice versa, which might be explained by a change of the interstitial edemas. Absolute (permanent) slight deflections of the EKG are bad prognostically, they are considered premortal. Even slight variations in the QRS-complex, light forms of interventricular block are frequent. In these cases, it will be sufficient to keep the patient under observation, and to ascertain by means of continual EKG-control that either the deflection disappears or remains constant and thus is no longer a symptom of an active myocarditis. On the whole, with a diphtheritic heart, the most important fundamental thing is the continual observation with the EKG. Only when the EKG is absolutely constant, may the patient be discharged from the hospital; as long as it is still changing, there is an active myocarditic process and the patient is to be confined to bed. It is not necessary to treat these cases with strophantin, provided there exists no dilatation of the heart. Remaining slight deflections in the QRS-complex should be judged as cicatricial changes; their overestimation is warned against. The majority of the cases with slight formation of deflections in the rising side of R or in the S-deflection are fit for general service again six months later, as the myocardium has completely recovered by that time, and the remaining slight scar is but an irrelevant defect. These cases will often pass their whole lives under the diagnosis of myocardial defect and may be sometimes treated with strophantin, which is absolutely useless. Besides these disorders of conduction or defects of the stimulation system, there is a second group: the change of the ST-wave and the final variation. Curves, with right or left auricular preponderance are remarkably frequent and usually disappear. Coronary forms of the EKG with arched ST-deflections and negativity of the final waves occur. They are prognostically more favorable than disturbances of conduction. It cannot always be decided whether they are toxic diminutions of stimuli in the inner ventricular wall or genuine coronary defects. Complaints of angina pectoris do occur sometimes. Typical pictures similar to the case of coronary infarct occur and may correspond anatomically to wider foci of necrosis within the myocardium. Slight upward and downward deflections of the ST-wave are observed rather often; if they are not more than one millimeter, they are irrelevant, even if they are permanent. For the coronary forms of diphtheritic defects of the heart, strophantin-therapy is the treatment of choice. The extrasystoles are of less importance. Ventricular extrasystoles of different origins indicate a form of myocarditis prognostically favorable in most cases. In the late stage, the exercise EKG may often reveal a latent myocardial defect caused by this form of extrasystole. Also elongation of the QT-wave may indicate a myocardial defect. To conclude, in the late stage, measurement of the QRS-complex with a lead from the chest-wall and a fast-revolving cylinder is important at times, such as SCHELLONG

and SCHWINGEL undertook. In a test at random of 22 cases of predominantly toxic diphtheria in the seventh week, I discovered five times a positive shortening of the QRS, interval within the normal range of variation; in 14 cases the change was less than two sigma; in three cases, a pathological elongation could be proven. Among the same patients, five still had a remaining myocardial defect; four had slight changes of the EKG, which could be considered only as irrelevant defects. In the exercise-EKG four cases failed, and one must take care not to consider a decrease of the final variation after exercise in leads I and II as a pathological reaction. On the other hand I should consider a perceptible downward deflection of the ST-wave in lead II after exercise, as well as the appearance of frequent extrasystoles to be important. All the same, the fact must be pointed out that T in leads I and II will often remain flat for a considerable time and rise to its normal height only weeks and months later. These flat T-forms after diphtheria indicate therefore a heart that has not yet recovered its complete efficiency. It is very difficult to evaluate the labile circulation of the toxic diphtheria case after rising from bed, i.e. in about the sixth or seventh week. In SCHELLONG's test of regulation, only two of 22 cases showed a hypotonic reaction with disposition to collapse, 11 cases reacted normally, 9 cases showed a disposition to hypertonic reaction. Altogether these cases with postdiphtheritic disposition of the circulation are "basedowified" (basedoid), but they have no increased basal metabolism. Such patients with their permanent disposition to acceleration of the pulse should not be kept in an hospital longer than eight weeks. They are not fit for duty in any arm of the service as yet it is true, but they are inclined to psychic superimpositions and must be occupied, careful training being the best way. As a rule, they must be judged as fit for garrison duty at home for another 2 to 3 months.

I should like to add some remark on the size of the heart. Large numbers of young men have an extraordinarily large heart today, and the frequent statement of diphtheria in the anamnesis might induce one to consider diphtheria as the cause. This is certainly not the case. But it must be considered that athletic training has considerably increased nowadays, that many people ride their bicycles to the places where they work, that many have to work hard in armament factories, and thus I am of the opinion, that all those large hearts have been occasioned by sports and work. The well-known tables of heart size, compiled by MORITZ and DIETLEN, probably would not prove correct today, the measurements of today probably being higher. Of course, exceptions are hearts which become large and flabby during diphtheria, which are recognized as flabby, changeable hearts even in the roentenogram and kymogram and which, in the course of some weeks, will be reduced to their normal size. This ability of diphtheritic defective hearts to reduce to the norm must be emphasized again. In contrast with articular rheumatism, the diphtheritic heart in its acute stage may possibly be in serious danger, sudden death by heart

failure through toxic myocardiac paralysis may occur, whereas the heart of a patient afflicted with rheumatism is not imperiled at all during the first few weeks. But if diphtheritic myocarditis is not fatal, it will practically always be completely healed, and persistend defects are very rare. Quite in contrast with this, a patient afflicted with rheumatism is threatened by development of late cardiac complications, in particular by defects of the cardiac valves which never occurs in the case of diphtheria.

In conclusion of my report, which need not consider paralyses, as they were dealt with before, I should like to point out that also for the ..... (typographical scramble in German text) ..... the safest remedy for preventing irregularities of the circulation is adequate serum-treatment, particularly in toxic cases. But if we add the cases with irregularities of the circulation, I mention for instance the cases of the reserve-hospital at Koeln-Hohenlind (ward-surgeon, Dozent Dr. SCHAEFER), a number of whose cases I am familiar with, and who kindly placed the reports at my disposal. Of 279 cases of last year only 48, i.e. 5.8 per cent, were dismissed as temporarily fit for garrison duty at home. Mortality amounted to 12 cases, that is 4.3 per cent. 219 cases, that is about 90 per cent, could be sent back to their units as fit for active service.

Directions concerning consequences of diphtheria: treatment, decision on fitness for military service, possibilities of service later.

1. For clinical purposes, a differentiation should be aimed at between

a. local diphtheria (pharyngeal, nasal, laryngeal, wound-diphtheria),

b. progressive diphtheria (without croup, with croup, and bronchial diphtheria),

c. toxic diphtheria, marked by edema of the mucous membrane and the outside of the neck and serious effect on the general state of health.

Serious toxic diphtheria may cause death within a few days and cannot be influenced therapeutically (hypertoxic form). The statistics show that the toxic forms, in particular, lead to serious involvement of the circulatory and nervous system.

2. Diphtheria passed without complications will heal without leaving behind any bad consequences. After 4 to 6 weeks of mild course and early administration of serum, complete fitness for active service can be expected.

3. The late diphtheritic sequelae of importance for evaluation are myocarditis and polyneuritis. Both are frequent complications of moderate and serious diphtheria, but may also occur with the mild forms, especially if they are not adequately treated.

4. The most efficient protection against diphtheritic sequelae is early diagnosis, and if the clinical findings are clear, immediate serum-treatment, which must be repeated two days later, if considerable membrane is still observed then. For mild and moderate forms doses of 6 to 12000 units are indicated. For serious cases up to a total of 20 000 units (more only in exceptional cases) are recommended.

5. The defects of circulation are:

a. early collapse of toxic diphtheria in the first two weeks,

b. myocardial defects in their various, mostly rapidly changing forms of appearance, such as prognostically favorable tachycardias and extrasystoles, changes of late waves and coronary disorders, delays of conduction and blocks which are most serious disorders. Total a-v block is considered to be highly unfavorable,

c. late irregularity of the circulation with disposition to collapse, tachycardias, hypertonic reactions.

6. For a favorable progress of myocarditis, strictest bed-rest is of fundamental importance until the acute inflammation has subsided, or better, until the electrocardiogram has returned to normal, since myocarditis may take completely latent clinical course, electrocardiographic examination, if available, should be made before the patients are permitted out of bed. Under field conditions, this ideal is not practical. In case of severe myocarditis, bleeding of the nose, vomiting, periglandular, edemas, apathy or deliria, swelling of the liver, cyanosis or striking pallor, enlargement of the heart, arrhythmias, and lowering of the blood pressure indicate irregularity of the circulation. As long as changes of the EKG occur which must be repeatedly observed the process must be considered as active. Upon symptoms of decompensation, intravenous injections of strophantin once or twice a day, ¼ milligram each time are indicated. If necessary, medicines against collapse in appropriate doses are recommended.

The proper treatment of postdiphtheritic irregularities of the circulation during the later weeks of convalescence is a carefully supervised treatment by exercise (no heart remedies).

7. The restoration of fitness for military service requires, besides clinical healing, the disappearance of EKG-changes. Patients having suffered a myocarditis should be judged cautiously but not anxiously. Small irregularities in the EKG must not be thought too important if they are constantly present.

Myocarditis, if not fatal in its acute stage, should be judged absolutely favorable in its later prognosis; permanent persisting disorders are rare. The period necessary for complete healing of myocarditis varies between several weeks and 3 to 6 months, sometimes even more. To attain complete fitness for active service when the EKG-changes have subsided, as a rule, takes about the same time that the myocarditis lasted. During this time, the decision fit for garrison duty at home and fit for labor duties (for a certain period), according to the severity of the case, may be considered. Regular expert examination by EKG are necessary. As soon as the condition has become stationary, the patient may be discharged from the hospital. Spa treatment after that is seldom indicated; it is strictly contra-indicated in cases of active myocarditis.

8. The following nerve defects are to be observed:

a. early paralyses in the 2nd or 3rd week (soft palate, oculomotorius (accomodation),

b. late paralyses from the 5th to the 9th week (pharyngeal muscles peripheral motor paralyses, ascending Landry forms).

9. If the danger of paralysis of the respiratory muscles has subsided, postdiphtheritic paralyses are prognostically favorable even if they last a long time. In the case of deglutition paralyses, there is danger of aspiration pneumonia. There are only slight therapeutic possibilities to accelerate the disappearance of the paralyses. Strychnine (3 milligrams a day subcutaneously) may be tried; the administration of vitamin B (B_1, B_2) is controversial. In cases with a poor tendency to heal (vaccino-malaria) fever therapy may be applied but only in specially selected hospitals and by surgeons who are experts in this field (control of the circulation!). If the patient has satisfactory conditions at home, the treatment at the hospital may be finished as soon as the patient has recovered sufficient mobility. The patient should be discharged as fit for labor duties with re-examination 6 months afterwards proceeding as in a case of "permanently unfit for military service". Only when the paralyses have disappeared, healing treatment with gymnastics and systematic training as a transition to garrison duty at home and later on general military service, is to be recommended.

10. Pay attention to the following further sequelae of diphtheria:

a. nephrosis 2nd to 5th week,

b. diphtheria recurrence 3rd to 7th week, only in cases not treated with serum,

c. associated involvement of the accessory sinuses and formation of abscesses (retrotonsillar abscess, mixed infections by streptococci).

11. When diphtheria is healed, no consequences of bodily injury sustained on active service will exist, as a rule.

By order of the army medical inspector, a conference on hepatitis epidemica was held during the meeting, from which the following report by DOHMEN and the informational pamphlet on hepatitis, which resulted from the discussion, are published.

Concerning the etiology of hepatitis epidemica.

Stabsarzt (Captain, MC.) Dozent DOHMEN

Starting from the consideration that, in case of hepatitis epidemica, the process of disease must take place within the liver and that if this process is caused by an agent, the latter must be accumulated there, we took small particles of the liver from a living man by a hepatic puncture made by Dr. VOEGT. We inoculated these particles on various species of animals and on chicken embryos. In the course of these examinations, it was found that white mice fell ill upon application of human hepatic material and showed, besides pulmonary changes, consistent changes of the liver. Among 16 hepatic punctures we thus attained positive results - which will be described later - in 13 animal tests, and have kept 7 strains for a long time, one of them up to the present day, that is nearly for a year. On an average, the passages amount to from 12 to 32, with the oldest strain the 37th animal passage has been attained. The observations described in the following are based on the results and observations gathered after the inoculation of 1900 white mice. After inoculation of the starting material gained by hepatic puncture, the animals were first afflicted with changes of the lungs, liver and spleen after an average incubation period of 14 to 21 days. The pulmonary changes, which were at first thought to be bronchopneumonia, consist of brownish-red changes of the size varying from dots to pin heads, partly even to lobes and which, pathologico-anatomically, turned out to be hemorrhages. A constant

enlargement of the liver and the spleen was found, e.g. the spleen may swell to 8 times its normal size. In the area of the liver, there are often observed, besides an enlargement of the organ, multiple whitish foci discernible under the capsule. No icterus can be observed in the animal. Besides those in the lungs, hemorrhages were at times observed in other places, too. We think ourselves justified to consider these hemorrhages as a result of hemorrhagic diatheses. Under the microscope, the hepatic changes appear mainly as changes of the minor vessels, which extended to their maximum, are often filled with an albuminous, amorphous substance, in the lumen of which numerous desquamated endothelia cells are to be seen. Kupfer's star-shaped cells of the liver have distinctly multiplied. The hepatic epithelium has also changed. Besides approximately normal cells, there are others with considerable changes of the cytoplasm and of the nucleus. The nuclei may be stained with difficulty, they are pyknotic and dissolved into single grains, the cytoplasm is clarified particularly at the rim of the cell, and hydropic to an extent that it often remains discernible only in little cloud around the nucleus. This enlargement of single cells or hepatic cells enlarged in groups will result in a more or less intense dissociation of the hepatic cells and in a destruction of the streaky structure of the liver cells. These changes have been described by Stabsarzt (Captain, MC.) Dr. VOEGT as primary capillaritis with secondary hepatosis after hepatic punctures on patients. In those livers in which whitish dotted changes can be ascertained macroscopically, one observes, histologically, in addition to that, the pictures of multiple hepatic necroses, as we know them from acute yellow hepatic atrophy. The time of incubation, beginning with 2 to 3 weeks, was reduced to 3 to 6 days in the following passages through animals. After the expiration of this time, the animals show brief symptoms of disease, and almost all of them die. By macerating the lungs and liver, one succeeds in producing the same clinical and anatomical changes in some passages. The animals will fall ill after the administration by subcutaneous, intrapulmonary, intracerebral, and intraperitoneal injections. The same changes can be continued by means of filtrates disinfected by passing through unglazed procelain candle or Leiz filters. In this case BERKEFELD filters N are still easily passed. Among the first two strains isolated in June 1942, the human starting material was not only inoculated in the animals but also on embryo chicken-eggs. After that one only observed an increased vascular injection in the region of the allantois, but otherwise no cloudiness whatever. Contrary to the inoculation of duodenal juice of hepatitic patients carried out by SIEDE and LUTZ at BUERGER's hospital in Leipzig, the embryo does not die after the inoculation. After the 4th passage on chickens, the animal tests were resumed once; here also the animals fell ill and died, showing pathologico-anatomically the same macroscopic and microscopic organic changes as the animals on which the starting material had been inoculated directly. Meanwhile, one more inoculation from the 8th passage through animals was made on the chicken embryo, inoculated again on the animal after the first passage, and

had been carried on in six animal passages so far. Here also the same changes as in all other animals could be observed. After these experiments, the material was supposed to be a filtrable virus. Then, an experiment was made to determine the identity of the virus by means of the neutralization test. The starting material were organ sample of typically diseased animals, which were mixed with the serum of men who had already recovered from hepatitis and were left, together with the serum, in the incubator for some two hours. In another experiment, the serum of soldiers of the Eastern Front was used. Demonstration of curves. Thus it is shown that the serum of men recovering from hepatitis contains vaccines against the infectious animal material, but that the normal serum of the soldiers of the Eastern Front is not free from them, either. The reason for this phenomenon might be a passive immunity of the soldiers of the Eastern Front. For further clarification of the matter, tests are being made with the serum of children, who certainly have not had hepatitis, but no useful result is available as yet. These neutralization tests were made on 252 animals. All of them took the same course and showed that through the human serum a neutralization of the virus material takes place so that it is in a position to reduce the mortality in the animal test quite considerably. That a living agent is involved in these tests is shown by the fact that one succeeds in producing, in the passages again and again the same changes leading to pictures of acute yellow hepatic atrophy, in filtering the infectious agent through unglazed porcelain candle filters, in cultivating it within the chicken embryo, and in producing the same changes as described above in tests of replanting the agent in the animal. As further examinations showed, the living agent has a distinct thermolability. It will become ineffective at incubator-temperatures for 3 to 4 hours, while according to our observations made so far, it will retain its effectiveness for more than a fortnight in a frozen state.

It seems improbable that the virus just described is the same as the already known broncho-pneumonic virus of the mouse, as described by GOENNERT and as the strains "I b" and "Greifswald" as described by HERZBERG and GROSS, since GOENNERT did not discover any morbid changes in the region of the liver and besides, both the virus described by GOENNERT and the two strains described by HERZBERG and GROSS may be transferred, according to a personal communication from HERZBERG, only by intrapulmonal application, but not, like ours, by subcutaneous, intraperitoneal, or intracerebral inoculation. Whether the virus is in some way responsible for the death of chicken embryos by inoculation of duodenal juice on the chicken allantois as observed by SIEDE and LUTZ, cannot be definitely decided, as no animal passages have been mentioned by these authors. It seems improbable anyhow, since, according to the treatises of the authors mentioned, the embryos die after application of the test material, whereas the lives of our ambryos are preserved. The experiments of transferring the virus on canaries, as reported by BUERGER during the last meeting of the Berlin Medical Society, cannot be evaluated as yet either.

In summary it can be said: By inoculation of human liver, which was obtained by puncture of hepatitis patients, it was possible to produce changes 13 times in 16 animal tests, by the consequences of which nearly every animal died. In these cases, histological changes could be ascertained which showed clinical pictures up to acute yellow hepatic atrophy. If the material is inoculated on the animal, a period of incubation will pass before the disease becomes manifest. As it could be managed to continue the material up to the 37th passage so far, a living agent must be involved. It can be transferred to the chicken embryo, and, starting from this material, the same changes can be produced again in the animal. On the other hand, also after direct inoculation of the hepatic material of hepatitis patients on the chicken embryo and subsequent transference in the animal, the same changes may be produced in the animal test as if the animal is directly inoculated. The transferred material is filtrable and thermolabile. All these facts suggest a living agent of virus nature. It is not identical with the well-known viruses of mice. Since the hepatic material of hepatitis patients was used as a starting material and animals in all passages were afflicted with hepatic changes, it may be supposed that the virus in question might be the agent of the human hepatitis epidemica. Even if a series of decisive observations have already been made, absolutely conclusive proof is still lacking. It is to be hoped that the tests still going on or begun will bring a definitive settlement of these problems.

Instructional pamphlet:

Epidemic jaundice.

(Hepatitis contagiosa sive epidemica).

1. Hepatitis epidemica is an infectious disease, appearing in large and small epidemics, but also in individual cases. The frequency of the disease is dependent on the season. They usually begin in July, reach their climax in October/November, and subside from January to March. It is a controversial point up to the present day whether hepatitis epidemica is identical with the sporadically occurring so-called "icterus catarrhalis" or simplex. In the majority of cases, it does not differ in its clinical picture from the so-called icterus catarrhalis.

2. Agent. The agent of hepatitis epidemica is still unknown. It is probably a virus. All agents known to us as yet have no etiological importance. The contagiousness of hepatitis epidemica is proved and is evidently very great.

3. Route of infection. Infection will occur both at the beginning of the acute icteric stage of illness and - predominantly - in the preicteric stage. Besides an infection by little drops and smearing, infection may also occur through food and water, through inanimate objects, and healthy carriers of bacteria. Children and youths are afflicted particularly easily. External circumstances (previous infections, hardships, hunger) may favor the outbreak of the disease by reducing the power of resistance.

4. Immunity. Having got over a hepatitis epidemica seems to confer immunity for life or at least for many years. A second affliction occurs only quite rarely.

5. Period of incubation. The period of incubation is 3 to 5 weeks, but may also be longer or shorter.

6. Clinical picture.

a. Forms of the disease.

In a number of cases, acute febrile onset with headaches, anorexia, dyspeptic troubles or catarrhal involvement of the upper respiratory passages are observed. Occasionally an initial shaking chill with most serious faint feeling and aches in the region of the liver is observed. In a number of cases with violent prodromes accompanied by fever, the initial stage is followed by an interval free from fever with comparative well-being, which is followed by the third (icteric) stage, occasionally with brief increase of the intestinal symptoms, but usually with disappearance of all subjective manifestations.

In other cases, initial non-characteristic symptoms without fever are to be observed instead of those violent onsets. These patients will often complain of lack of appetite, sense of fullness, sometimes abdominal pains, and a more or less pronounced exhaustion. At times, the icterus is preceded by a short or long period of diarrhea. In other cases again, the icteric stage does not appear. Thus, the disease, for which the symptoms of the first stage have become most important now, will often not be recognized and will be diagnosed as influenza or intestinal trouble.

The icterus may also occur without any prodromes whatever, so that it is sometimes not the patient, but his companions that first notice the disease.

b. Particular results of examination.

Icterus, which can be ascertained first in the sclerae, will grow more intense within the first few days, is colored at first canary, then dirty-yellow to yellowish-red, and assumes a greenish tinge only when it takes a severe and protracted course. At first, the liver is always enlarged and often is also sensitive to pressure. In the majority of the cases, a swollen spleen is also to be found. In the urine, urobilin, urobilinogen, sometimes acetone, and, in

the cases afflicted with severe icterus, always bilirubin are to be found. In other cases again albuminuria of slight degree, occasionally with some erythrocytes, leukocytes and cylinders, is to be observed in the sediment. In the icteric stage, the blood picture shows normal or subnormal numbers of leukocytes; there is often a shift to the left of the granulocytes with a relative increase of lymphocytes and monocytes and high normal values of the eosinophiles, often rising, during the further course of the disease, to a marked eosinophilia. In the beginning the sedimentation rate is usually slightly accelerated and will continue to increase until the third week. The sedimentation of the blood corpuscles does not exclude hepatitis contagiosa.

7. Course of the disease. The disease will take a different course in different places, both as regards the clinical picture and the severity of the symptoms. Mild cases will be cured even within one or two weeks; moderate cases will take 4 to 6 weeks before they are healed. On the other hand, severe cases may continue in the icteric stage for months. In quite isolated cases, transitions to acute or subacute yellow hepatic atrophy or to hepatic cirrhosis were observed. Recurrences after icterus had already subsided will occur more frequently. Too early chilling, dietetic and physical strain will cause recurrences, but even bed-rest and special diet cannot always prevent them. They often delay and complicate the disease considerably. Besides typical icteric forms, also anicteric forms of course occur, as mentioned above, which are usually treated ambulatorily without proper diagnosis as "grippal infection" or "gastro-intestinal catarrh". Convalescence is often characterized by a remarkable weakening of resistance to other infections.

8. Differential diagnosis. Discrimination from Weil's disease is easy (anamnesis, usually by the acute beginnings with a shaking chill and high fever, aches in the calves, albuminuria and hematuria, often serious disorders of the renal functions, even uremia, high acceleration of sedimentation rate, leukocytosis, liability to collapse, weakness of the circulation). Mud fever seldom shows an icterus, but nearly always exanthemata, while hepatitis epidemica is accompanied by exanthemata only rarely and then usually as urticaria with itching. The possibility of pseudo-icterus after intense atabrine-treatment, in which the sclerae get no yellow coloring, and of an icterus as attendant symptoms of severe infectious diseases (malaria, blackwater fever, pneumonia, paratyphoid, sepsis, etc.) must be considered.

9. Pathologico-anatomical findings. In pathologico-anatomical respects, there appears an inflammation of the mesenchymal part of the liver - capillaritis - with evident secondary hepatosis. No serious inflammation occurs in the icteric stage. In the cross-striped skeletal muscles, miliary necroses are to be found.

10. Treatment. In order to prevent serious sequelae and to restore the patients to health more quickly, it is necessary to give them a thorough treatment.

a. General and medicinal treatment. Till the icterus subsides, strict bed-rest must be mainained, usually for 3 to 4 weeks, with consideration of the sedimentation rate, increase of weight, and disappearance of swellings of liver and spleen. In case of disorders of gastric-juice secretion, prescribing hydrochloric acid and pepsin must not be omitted. Analgetics, narcotics, and sleeping drugs (particularly barbituric acids) should be administered, but only in small doses or better not at all, because of their hepatotropic effect. Medicaments to stimulate choleresis and disinfection of the bile are unnecessary, the tea mentioned below excepted.

Not only in the beginning, but for the whole duration of the treatment, particular attention must be paid to the activity of the intestines, since the liver may be affected by processes of fermentation and putrefaction, with toxin-resorption, caused by atony and insufficient exercise. In the beginning, purgatives (2 to 3 tablespoons castor oil or 1 to 2 tablets of castor rhei or twice an hour 0.3 calomel with addition of podophyllin, e.g. in form of cholagogues) are suitable, even if diarrheas exist. If constipation occurs in the further course of the disease, Karlsbad-salt and bitter water will prove efficacious. Adrenal cortical extracts have a beneficial influence on the intestines by their tonic effect by retarding the resorption of toxins, but they may be dispensed with in most cases.

If the icterus is persistent, duodenal rinsing with 300 cubic centimeters 10 per cent solution of magnesium-sulphate has a beneficial effect. Moderate and continuous application of heat (electric pad, Priessnitz bandage, thermophore, cataplasms etc.) is not only felt as agreeable, but evidently has, like short-wave diathermy, when carefully applied, a beneficial influence by improving the blood-supply of the liver. Liability to hemorrhage, which often exists in the case of an intense icterus, may be successfully opposed by injections and peroral administration of vitamin K. Particularly in the case of protracted illness, vitamins C and B should be parenterally (resorption!) administered. As for brief icterus, additional administering of insulin to grape-sugar therapy is unnecessary, I dare say. By biopsy of the liver, we know that the liver is not deficient in glycogen in the acute stage of catarrhal icterus. Irritating itching of the skin may be alleviated by embrocations of vinegar-water or menthol, possibly also of mitigal. Semibaths of 35° to 40° Celsius, too, have a beneficial effect.

In cholecystography, caution is recommended for some time after the parachymatous icterus is overcome, while it must not be made during or shortly after the disease (up to 2 months).

In times of accumulated occurrences of hepatitis epidemica, powerful hepatotropic medicaments (such as Salvarsan, mercury, phosphorus, etc.) must always be administered with caution.

b. Dietetic treatment. After a few initial days of hunger - uncooked food - (apple-diet) or juice-diet, the patients receive chiefly soluble carbohydrates (gruel, porridge, puddings), besides fruit and jam and gradually vegetables and potatoes which are easy to digest. If there exists no acholia nor hypercholia, fat may be given early in the form of butter in small quantities, or of egg yolk. Animal protein in the form of meat should be given with caution, it should be added to the diet only if the icterus has distinctly decreased and the whole clinical picture has generally improved. For this reason, protein should be given but in a form that is easy to digest, preferably as milk and curds. Cabbage, legumes, inferior fats and fresh bread will prove indigestible for a long time. Slices of stale bread, cold toast will often render superfluous the prescription of white bread. A sufficient supply of liquids in the form of fruit-juices, hot lemon-juice, caraway, peppermint, and camomille-tea must be provided. All forms of alcohol must be strictly prohibited for a long time. If the initial diet is rich in carbohydrates, the supply of grape sugar may be dispensed with. It should be provided only in serious cases. Also continuous intravenous drip-infusions (10 per cent) and injections (30 per cent) of grape-sugar solution may be administered. In very serious cases resistent to therapy, drop-enemas with a duodenal catheter, placed in the stomach or duodenum, which is introduced preferably through the nose, with 4 to 6 liters of 5 to 8 per cent grape sugar solution with an addition of 1 per cent sodium chloride have had a most beneficial effect. They are made several days in succession.

c. Use of medicinal springs. Spa treatments at Karlsbad, Mergentheim, etc. are indicated only with diseases which have become chronic and leading to permanent injuries to the liver, and then only for a limited time (4 weeks). In all other cases they are unnecessary.

11. Isolation and measures of organization. Since infection occurs chiefly in the pre-icteric stage and the latter is diagnosed only in exceptional cases, isolation will be too late in most cases. For this reason, it has proven unnecessary. The vast numbers of patients suffering from jaundice at the same season makes it advisable for mere reasons of simplification, to unite the hepatitis patients in particular hospital wards, rooms, etc. and later on in hospitals for convalescents. Hospitals for convalescents have, above all, the purpose of receiving men with mild diseases and thus to keep them near the front. Besides long transport, particularly under unfavorable climatic conditions, are harmful to hepatitis patients and result in long unfitness for military service.

12. Making of reports. In the sick reports of the units (Army Manual 21, part II, form 2) and in the sick reports of the hospitals (Army Manual 21, part II, form 4) every case of hepatitis is to be entered in disease group I under number 12. During periods of accumulated occurrence jaundice is to be considered as hepatitis epidemica, if it cannot be clearly traced to other causes, such as stone obstruction, hemolytic icterus etc.

13. Evaluation by the Army Surgeon. Every icterus is to be considered as a more or less serious parenchymal injury of the liver, therefore, it must be thoroughly treated at a hospital. The vast majority of the cases (about 90 per cent), however, will lead to restitutio ad integrum comparatively soon. But icterus is only a symptom, after the disappearance of which the hepatic injury may continue to exist. In case of premature physical and dietetic strain, remaining injuries may lead to chronic injuries of the liver. For this reason, swellings of the liver and of the spleen urobilinuria, acceleration of the blood sedimentation rate, also ability to tolerate the normal diet and physical strain ought to have disappeared, before military duty is resumed. But isolated enlargement of the liver, urobilinuria, slight acceleration of the sedimentation rate as well as slight increase of the values of serum-bilirubin and positive Takata-Ara reaction, which may often be ascertained long after icterus has disappeared, must not lead to a hospital treatment protracted for weeks and months, yet such patients ought to remain under medical observation (at homes for convalescents or in the field sick bays). If the remaining consequences have become stationary and the general condition of health permits a discharge from the hospital, it should not be delayed, as increasing physical strain with light military duties (fit for garrison duty at home) may have a beneficial influence upon the restorative processes of the liver - the blood supply of the liver being improved - and an unnecessarily long stay at the hospital will not infrequently lead to additional hospital infections (weakness of resistance), which are again injurious to the liver. If there are doubts as to whether remaining disorders will heal completely, discharge as "fit for garrison duty at home" with re-examination at a hospital 3 months afterwards is recommended. The latter is advised particularly with recurring diseases. Serious chronic hepatic injuries (hepatic cirrhoses) are to be judged as "unfit for military service". Patients who have got over a serious hepatitis, but with some disorders still remaining, ought to be exempted from duty in regions with difficult food supply and particularly unfavorable climatic conditions (South-East and South).

VIII.

PROCEEDINGS OF THE CONSULTANTS' COMMITTEE ON PATHOLOGY

Translation prepared by:

Office of Military Government for Germany (U. S.)
Office of Naval Advisor
Medical Section

Injuries after treatment with sulfonamides.
(See Section II, Articles 7 - 9)

Inflammatory diseases of the central nervous system.
(See Section XI, Article 5)

Calling up for military service of men having injuries due to cold.
(See Section II, Article 12)

1. Legal status of soldiers having malignant tumors in view of the question of line of duty injuries.

Oberstarzt (Colonel, MC.) Privy Councillor Professor BORST

Concerning the question to what extent body injuries received in service are connected with the manifestation of malignant tumors, the current theories concerning the formation of tumors were discussed critically. None of them are without the assumption of a particular predisposition. Besides, the directions elaborated until now concerning the relation of trauma with the formation of tumors - the question of the severity of the trauma, the local and temporal conditions and the so-called borderline cases - were criticized. The difficulties arising in the judgement of the time required for a malignant tumor to grow and to destroy life were discussed. We generally take a sceptical view as regards the significance of acute isolated traumas for the formation of malignant tumors. We admit that a trauma may further the predisposition to the formation of tumors existing in particular cases. Chronic irritations or injuries are more closely related to the formation of a malignant tumor, particularly to carcinomas. In this process, not only the duration and intensity of the irritation, but also the particular kind of irritant is important. Pointing out the fateful character of ulcer one must not altogether ignore the influence of material factors. But their significance is the less, the more certain predispositions are present. Besides, the question of the progress of an already existing ulcer as a result of trauma or by a local or general disease was discussed. Also the question of the significance of general war-conditions for the formation and aggravation of malignant tumors was considered. The question of acknowledging how far body injuries received in service are due to delay of the necessary medical treatment of a tumor was discussed. Lastly, the connection of body injuries received in service and malignant tumors was illustrated by examples of some frequent malignant tumors of certain organs - the brain, the bones, the lungs, the rectum, the skin, and the testicles.

It was regretted that the decisions arrived at from the purely scientific point of view are often not understood by the people and are thought of as being inconsiderate of the people. The opinion that all tumors which

manifested themselves during the war must after all depend, eventually, on the various influences of military service, is met with the statement that there are no scientific foundations whatever for such a conception. In forming an opinion, we medical men must stick to these foundations. It is important, that above all the surgeon in charge is fully conscious of his responsibility and forms no rash, insufficiently founded diagnoses, raising hopes in the patient that will not be fulfilled and that will shake the people's confidence in science and in the doctors.

Discussion:

GRUBER: Consultants opinions concerning the legal status of soldiers with body injuries received in service often led to the statement that malignant tumors were recognized in time, that, however, - instead of intervening during the stage of probable operability, the surgeon had the patient discharged from military service, so that, during the lengthy term of the procedure of discharge, the propitious period for intervention was missed. In my opinion, it must be a rule also for the military surgeon to find at once the means for treatment after diagnosing a tumor probably operable or which may be beneficially influenced by some other method.

I wish to corroborate the large numbers of carcinomas of the stomach arising from ulcers among the specimen sent in by renowned stomach operators (surgeons). As a matter of fact, the proportion of ulcers of the stomach to carcinoma arising from ulcers is the same now as thirty years ago.

SIEGMUND: As far as I can see, the question of acknowledging body injuries received in service in case of tumors takes a similar turn as that of lymphogranulomatosis, which was discussed during the last meeting. It seems absolutely necessary to me to discriminate between scientific opinion and that influenced by social policy. The pathologist must be guided by strictly scientific rules, according to Privy Councillor BORST's instruction, which deserve complete approval. Consideration of war conditions to a large extent should be subject to particular instructions and regulations. Within our field of work, trauma is related to a more rapid progress in cases of seminomas and melanoblastomas than elsewhere. Carcinomatous ulcers will be ascertained more easily and frequently in patients to be operated on than in corpses for autopsy.

GRUBER: I wish to make a suggestion to the Medical Inspectorate: the Veterans' Administration of the NSDAP can be a very beneficial organization, if its officers succeed in reconciling the wishes of the veterans and their families with the biological facts. But it is regrettable and contradictory to the efforts of the public health authorities to strengthen the people's will for health and efficiency, if arguments of officers of the Veterans' Administration raise hopes and expectations in veterans or their families, which must be absolutely denied by an expert surgeon. In

complaints against such negative medical opinions it was pointed out that the people felt differently. The scientist asked to state his opinion must consider the questions as they are put to him, which are founded on the regulations of the particular laws. He must not accommodate non-professional feeling outside the limits of these regulations. If allowance is to be made for this feeling, the legal regulations for the possibilities of taking care of veterans must first be altered.

RUEHE: Points out that forming an opinion on the question of body injuries received in service in cases of malignant tumors is unsatisfactory on the whole, as too little is known as yet of the original or aggravating relations of the influences of military service to the formation of malignant tumors. Therefore the practical needs must be considered in drawing up directives. Special conditions of military service, which may also lead to the ackowledgement of body injuries received in service, do not only exist, if a disease is ascertained or treated too late owing to war conditions, but also if a wrong diagnosis is formed or a wrong treatment is undertaken. So-called popular opinion is often at variance with medical opinion and so renders the surgeon's task more difficult. Even if this is humanly understandable, scientific medical knowledge cannot be changed for that purpose.

In the evaluation of this discussion the following

Instructions for the evaluation of the question of body injuries received in service in cases of malignant tumors

were drawn up.

Experiences in the final evaluation necessitate the drawing up of general instructions for judging the question of body injuries received in service in cases of malignant tumors. These instructions are not meant to be a formula to be applied mechanically, but each single case must be judged individually, according to circumstances and expert findings.

In the first place, the difficulties in the judgement of the question of body injuries received in service arise from the fact that the problem of tumors still involves many unsolved questions. Besides, sufficiently numerous instances, statistically confirmed, for the judgement of the question of the actual interdependence of the formation or decisive aggravation of an ulcerous disease and characteristic influences of military service on it are still lacking.

Medical experience, particularly from the first World War, positively showed, that no increase of malignant tumors occurred through military service. In only a few special cases was a genuine interdependence between body injuries received in service and the formation or aggravation of tumors assumed as probable.

For this reason, in the judgement of the question of body injuries received in service in cases of malignant tumors, the same principles generally recognized by scientists apply as is the case in civil processes. Of course, in military cases, the law concerning financial and other aid provided for regular soldiers on their return to civilian life and the law concerning financial and other aid provided for discharged soldiers must be consulted. Those regulations differ in many respects from the legal bases for civilian judgement. They are sometimes worded less strictly. For instance, the simple probability of an original connection for the question of the formation or aggravation of a tumor will do for acknowledging body injuries received in military service.

The question whether an earlier detection of the ulcerous disease was prevented by the special circumstances of military service, must be particularly examined in every individual case.

On principle, the importance of so-called irritants blamed for the development or aggravation of tumors should be examined most carefully. Acute irritants, such as isolated traumas, are but rarely responsible for the formation of tumors. Chronic irritants of a certain kind which, experience shows, may cause a formation of tumor more frequently, are of but slight significance in the Army.

As long as the regulations now valid are in force, it is the duty of medical men to judge the question of body injuries received in service only from the scientific point of view.

2. Pathology of injuries caused by Salvarsan.

Stabsarzt (Captain, MC.) PETERS

Just as in the last World War and during the post-war period, still today considerable numbers of disagreeable incidents in treating syphilis with Salvarsan occur. It is, above all, involvement of the central nervous system that occurs more frequently.

Clinical symptomatology (headaches, giddiness, vomiting, numbness) indicates a general increase of pressure within the skull. The pathologist accordingly finds an increase of volume of the brain caused by an edema. Edema is the cardinal symptom of cerebral injuries caused by Salvarsan. In the cortex and medulla, there is a diffuse or focal loosening of the basic tissue due to edematous infiltration. A hypoxydosis caused by this will soon lead to injuries of the nerve-cells and the medullary sheaths. Hemorrhages, which were always thought particularly significant in former reports, are of secondary importance as regards clinical

symptomatology and fatal outcome. They occur, principally, in those parts of the medullary layer of the cerebral hemispheres and of the cerebral horns which are close to the ventricels, located symmetrically in the internal capsule, in the pons cerebelli and in both cerebellar peduncles. This localization is to a certain extent characteristic of injuries caused by Salvarsan. Because of the hypoxydosis caused by the edema and hemorrhages, complete and incomplete necroses will develop later on in the cortex and marrow, with corresponding reactive symptoms in the neuroglia and the glia. Independent of the cortical injury caused by the edema, isolated necroses limited to the vessles are observed, which may be related to cerebellar disorders of the circulation preceding epileptic fits. The edema and the hemorrhages depend on a change of permeability of the vessles. The increased permeability of the vascular walls may be the consequence of a toxic effect of Salvarsan on the endothelium of the vascular walls. On the other hand, animal tests made by RICKER and KNAPE show that Salvarsan acts as an irritant on the vascular nerves. Thus, after use of Salvarsan, a narrowing and finally an enlargement of the vessels with prestasis and stasis will ensue. A resulting hypoxydosis may also cause functional disorders of the endothelium of the vascular walls in the form of an increased permeability of the membrane.

Numerically, second place was held by injuries to the skin caused by Salvarsan (dermatitis). To the same extent, the hematopoietic system (agranulocytosis, aplastic anemia, panmyelophthisis) and the liver (acute and subacute hepatic atrophy) were affected.

The changes in the central nervous system and in the skin are doubtless caused by Salvarsan. Injuries to the hematopoietic system and to the liver may be caused both by lues alone and by Salvarsan.

The assumption of a toxic effect is sufficient for an explanation of the changes observed in the different organs. All the same, numerous clinical observations and also some available cases as well as the anatomical substratum of available cases do not exclude a possibility that the injuries caused by Salvarsan may occasionally be due to antigen-antibody reaction, i.e. to an allergic process.

As a cause of the frequent occurrences of injuries due to Salvarsan, the lack of surgeons sufficiently trained in this field, the changed diet, and accumulated occurrences of hepatic injuries (hepatitis infectiosa sine ictero) are mentioned.

Discussion:

LAUCHE: The question of the influence of climatic conditions was raised by BENECKE, because no further injuries were observed in the South-East when the place of treatment was transferred from Athens to Belgrade. The curve of frequency can only be judged if the total number of the cases treated is known. As experience shows, the numbers of men with venereal diseases will decrease in winter, as a rule.

STAEMMLER: In the region of Breslau, we observed both in the Army and among the civilian population, injuries to the liver and to the hematopoietic system much more frequently than injuries to the brain. I should like to be informed whether in the different districts of consultants the injuries to the different organs are proportioned differently.

OSTERTAG: The frequency of injuries caused by Salvarsan in this war corresponds to the frequency after the first World War. The observations (Pathological Institution of the Charité) often mention high doses of Salvarsan, it is true, but these injuries caused by Salvarsan occurred in the period of accumulated hepatic injuries. According to my observations, the question of the frequency of cerebral injuries must be answered in this way that the liver is always affected first and cerebral injuries occur only after the liver has failed. Among the injuries caused by Salvarsan 20 years ago, no involvement of the bone marrow and no agranulocytosis were known, but a re-examination of old preparations proves clearly that these also existed at that time.

BOEHNE: No particular accumulation of fatal cases caused by Salvarsan occurred at the central sector of the Eastern Front. Technical mistakes in performing the injection were pointed out, such as intravenous injection of bismogenol with subsequent fat embolism and brain purpura.

NEUHAUS: Within our Army sector on the Eastern Front, fatal cases caused by Salvarsan have been insignificant as yet. Amongst the fatal cases caused by Salvarsan, which I autopsied in peace time in the district of North-West Germany, hepatic changes were predominant and were particularly more distinct than cerebral changes.

SIEGMUND: No discussion is necessary on the fact that the cerebral changes are a result of local disorders of blood supply, and take a course up to stasis by way of peristatic processes, with and without plasma- and erythrodiapedesis. To what extent it is the anoxia that causes the permeability of the vascular walls, cannot be safely said as yet either for Salvarsan or for other factors effective etiologically in corresponding disorders of blood supply. The most urgent question is, why these disorders of the circulation occur above all in the brain and only occasionally in other places. In this connection, the remarks of OSTERTAG are particularly interesting; the injuries caused by Salvarsan are in the final analysis consequences of (relative) overdoses with weakened resistance of the patient.

KLINGE: It is pointed out that in the USA, during and after the World War, a temporary increase of fatal cases caused by Salvarsan was observed, but the increased toxic effect, which was assumed could not be accounted for.

NORDMANN: The injuries caused by Salvarsan, which were observed when the drug was put to the test at Magdeburg, also occurred above all in the brain. At that time, large doses were given.

KOCH: In three fatal cases of Salvarsan which were autopsied it has been determined that overdosage was no factor. The cerebral changes were more impressive because of the seriousness of the serous inflammation which has led more to actual local accumulations of plasma alongside the vessels than to hemorrhages.

LAUCHE: Since injuries caused by Salvarsan have recently ceased almost altogether, I am of opinion that avoidable causes played some part in them.

3. Concerning pathology of injuries caused by inoculations.

Oberfeldarzt (Lt. Col., MC.) Prof. KLINGE

With the aid of several tables, the lecturer gave a survey of the observations in 24 cases, in which death occurred as a direct or indirect consequence of inoculation. The majority of these cases, 16, proved fatal after protective inoculation against typhoid. Among these 16 cases, 5 were caused by coccal infection of evidently secondary nature. Two fatal cases after protective inoculation against typhoid were regarded as acute or protracted anaphylactic shock, as has been occasionally observed before in the literature after intravenous and subcutaneous protective inoculation against typhoid (ZISKIND and SCHATTENBERG). The finding of hepatic typhoid symptoms after inoculation as reported by MEESEN still requires systematic research, since it was but rarely observed in autopsies among the vast numbers of soldiers examined after inoculations. According to the lecturer, 5 more cases prove that men suffering from organic cardiac diseases, particularly coronary stenosis, but also valvular defects, may succumb to a fatal attack of angina pectoris through the inoculation (1st to 3rd inoculation against typhoid), above all, if they have attained or passed the 4th decade of their lives.

In 4 cases, disorders of the circulation were found, particularly hemorrhagic diatheses, twice affecting the intestinal tract, once the meninges. In a fourth case, hemorrhages in the brain after recent thrombosis in an encephalic angioma were observed. In accordance with the observations mentioned in the literature, these disorders of the circulation must be explained by the SANARELI-SCHWARTZMANN-phenomenon. No clear significance of the number and temporal succession of inoculations can be ascertained. In 3 cases, the inoculation against typhoid was immediately followed by a thrombosis, twice in a coronary artery, once in a cerebral angioma. A pachymeningitis haemorrhagica interna was caused in one case 2 days after the 2nd inoculation by drill with full packs in the sunshine. In a

particular case, a coccal phlegmon set in at the site of inoculation, but when death occurred, abdominal typhoid was ascertained. It appears doubtful whether the opinion of the surgeon executing the autopsy, viz. that typhoid was caused by the inoculation, is correct.

After vaccination against dysentery and smallpox, only secondary coccal infections were ascertained as causes of death by the autopsies.

The fatal cases after inoculations against diphtheria, gas-gangrene, and tetanus were caused by serum injuries; these are partly primary serum sensitivity (idiosyncrasy) without previous contact with the serum, partly previous sensitization by injecting the serum into the tissue with subsequent intravenous injection.

Discussion:

LAUCHE: Whether the 5 fatal cases of coronary sclerosis can have been caused by the inoculation, seems doubtful to me, considering the comparative frequency of sudden fatal coronary cases, particularly, as in 2 cases death did not occur until 2 or 3 days after the inoculation.

NORDMANN: As regards the 24 cases reported as injuries caused by inoculation in wartime, I think myself justified in remarking that these are but part of the actual cases. Some cases are not registered with the chief disease or cause of death as being a consequence of injurious inoculation, but appear under another diagnosis. This will probably be the case, if the surgeon who made the autopsy was convinced that the injuries caused by inoculation could not have been decisive. Therefore it seems advisable to complete the list of these cases by making further inquiries among the pathologists, who, I dare say, will remember their own cases. The relation between coronary sclerosis and an injury caused by inoculation may be very loose. Thus, I observed a case in which death from coronary sclerosis occurred a few hours after the patient concerned had been deferred from the inoculation because of irrelevant complaints.

GRUBER: I refer to the discussion of possible morphological consequences of protective inoculation against typhoid, which was held 27 years ago during the meeting of war pathologists. Even at that time, certain changes of the reticuloendothelium in the lumphatic glands were found. Also the subject of coronary sclerosis or of men with cardiac injuries and subsequent inoculation was touched upon even then. At that time, chiefly death from coronary injuries was discussed, which naturally might prove fatal by the additional strain of the consequences of inoculation.

4. Pathological anatomy of tularemia.

Oberstabsarzt (Major, MC.) Dr. SINGER

The report on the pathological anatomy of tularemia is based on four observations, three of which were submitted as autopsy-records, while in one case an autopsy was made by ourselves, which could be judged by pathologico-anatomical, histological, and bacteriological examinations. The observations were arranged under the various forms of tularemia according to the classification made by LAUCHE at the first conference of medical consultants at the Eastern Front, 1942, which does full justice to all pathologico-anatomical points of view according to our knowledge of the clinical picture so far:

LAUCHE distinguishes two main groups:

1. Glandular or bubonic form, which also may be called the external glandular form. The primary infection may be observed on the surface of the body (skin, conjunctiva) and at the orifices of the body (tonsils, pharyngeal mucous membrane), the regional lymphatic glands being affected by it, or, when the place of entrance of the agent cannot be recognized any more, as the purely glandular form.

2. The internal, intestinal or enteral form, in which, too, the involvement of the lymph glands is predominant and the place of entrance of the agent into the respiratory tracts and into the intestinal canal must be determined mostly by conjecture from the involvement of the regional lymph nodes. The generalized form of the disease with tubercular necroses in almost all internal organs is not yet known well enough to ascribe to it a special position now. The ulcero-glandular form of tularemia is no special group of diseases, but may be regarded, along with the external glandular form and in the internal intestinal form, as a complicating stage in the clinical course, with breaking through to the exterior and to the interior.

As regards the frequency of the single groups of the disease, there are considerable differences between the statements of American scientists and the observations on the Eastern Front. According to the latest reports (BOGENDOERFER), 30 per cent are to be considered among the pure glandular form, 70 per cent among the internal or intestinal form. The route of infection by contaminated food apparently plays a more important part on the Eastern Front (BOGENDOERFER).

Considering the still few cases available for examination, it is impossible to give a comprehensive description of the pathological anatomy and histology of tularemia. Even these few observations are still rather unsatisfactory as to their judgement. In all four autopsies, the examiners only arrived at the diagnosis "probably tularemia", which was based chiefly on the positive serological findings, or the peculiarities in the anatomical findings (irregularities of the tissue picture)

led to differential diagnosis. Among the observations described in detail, one case belonged to the ulcero-glandular form with erosion of a larger artery branch, one case to the internal or pulmonary form (DOERR), one case to the internal intestinal form (HARTMANN), and one case to the internal pleuro-pulmonary and intestinal form of tularemia (my own personal observation). Of particular interest were penetrations of the soaked mesenteric granulomas of lymph nodes into the abdominal cavity with ensuing death by peritonitis, the formation of peculiar infiltrating tumors in the ileum, larger confluent foci of necrosis and granulomas in the fat-tissue of the mesentery of the small intestine, particularly where the rectal tube is inserted, and the dissemination of nodules on the peritoneum.

The histological results do not differ much from the already known findings of former examiners. The granulomas of tularemia much resemble tubercles. The cases examined by me showed a certain range of variation in the tissue constituents of the exuberant granulations, and also the tissue necroses often show apparently different forms of progress. The inflammatory reaction in the neighborhood of the necroses and granulomas is often distinguished by more intense histiocytic exuberance and proliferating processes on the vessels, particularly the veins.

This peculiarity is probably not only dependent on the prevailing form of reaction of the organism and its tissues, on the virulence of the agent, and on mixed infection by other bacteria - which does apparently occur often - but also on the place where the granuloma developed, or was formed by reaction to previous tissue necrosis. I still doubt whether these morphological findings are a positive characteristic of tularemia. The difficulty of diagnostic judgement is illustrated by the fact that I was able to prove tubercle bacilli in a culture by way of guinea-pigs from a lymph node at the hilus pulmonis of my case, which was granularly changed. For the present, I suspect that a latent tuberculosis was activated by the infection with tularemia. Such disappointing results of examination, however, urge one to proceed with the utmost caution in the purely morphological outlook on the clinical picture.

Summary: The diagnosis of "tularemia" cannot yet be safely formed by pathologico-anatomical and histological examinations. In the evaluation of serological test findings some reserve is advised.

Discussion:

LAUCHE: Though we have but inadequate knowledge in this field, I proposed to put tularemia on the agenda, as tularemia occurs more frequently also in the home country, and above all the workers from the East are afflicted with it. Thus, I was asked several times to examine cervical lymph nodes with the conjectural diagnosis of "tularemia".

In other cases, the histological examination raised the suspicion of tularemia, which was sometimes even strengthened by the result of the serological reaction. After all, the positive serological finding is no definitive proof, for it may have been caused by an infection, which was previously overcome.

Demonstration of a case of evident combination of tularemia with tuberculosis in cervical lymph nodes.

RANDERATH: Demonstrated the clinical pictures of patients with oculo- or tonsillo-glandular tularemia. With the aid of microphotographs the microscopic changes in the lymph nodes are demonstrated. It is believed that a microscopic diagnosis of tularemia is possible, or, at least, an indication of the possibility of existing tularemia may be given.

NORDMANN: As regards the possibilities of diagnosing tularemia from the histologic preparation, I share RANDERATH's optimism. If a tularemia nodule can really not be distinguished from a tubercle, the situation is the same as with the differential diagnosis between lues and tuberculosis. In the case of tularemia, therefore, the diagnosis should be formed particularly by making use of the clinical data. I am in a position to supplement SINGER's lecture by a report of one more autopsy. That case too proves that the diagnosis of tularemia may be formed from the anatomical findings, for I could form it even at the autopsy table, though, clinically, the diagnosis of typhus had been formed. The patient died after 20 days of a typhoid clinical picture and had, at times, a distinct agranulocytosis. This case is of particular interest, since the anatomist was here in a position to show - for the first time as far as I know - a primary tularemic affect in the lungs. There already exist excellent clinical roentgenograms of such primary involvement. Morphologically, our case showed a hepatization of the size of a bean with a yellow edge, and micro-anatomically, a hepatization with beginning necrosis of the alveolar walls. A wall composed of lymphocytes, a border of fibrocytes, and a beginning carnification formed the surroundings. The lymph nodes at the bifurcation and at the corresponding side of the trachea showed caseations and suppurations, as well as numerous nodules. The mesenteric lymph nodes and the cervical lymph nodes were affected to a considerably small extent. There were also a few isolated axillary and inguinal nodes. Besides, the man had subcutaneous and intracutaneous abscesses and tumors. In all infected regions gram-positive accumulations of cocci were found.

The diagnosis of tularemia was confirmed by the animal test from the dissected organs.

RANDERATH: As regards the subdivision of tularemia, it is proposed to speak of a tularemic primary complex and to differentiate an exterior primary complex (tonsillo-glandular, oculo-glandular forms) and an internal tularemic primary complex (thoracic and intestinal forms). Besides

these, there are lympho-hematogenous forms of general spread with specific changes in numerous inner organs, the meninges included. The serological reaction does not remain positive as long as states in the literature on the subject.

NEUHAUS: In the region of the Oka (Orel), where tularemia is known to be widespread, we could make no autopsy of any positive case of tularemia within our Army District during the winter-months of 1941/42. In two cases sent in for autopsy, which had been diagnosed as tularemia, this diagnosis was not confirmed. Both cases had shown a positive agglutination titer for tularemia. In one of the cases an extensive caseating glandular tuberculosis with a proven tubercle bacilli in the caseated glandular parts was observed. A histological examination of this case yielded the result of typical tuberculous granulation tissue, without any peculiarities.

SIEGMUND: In the southern sector of the Eastern Front, tularemia played no part at all in the Army and among the population either in 1941 nor in 1942. On the other hand the Russians had, in their institutes at Stalino, Rostow, and Krasnodar, a number of good macroscopic collection-preparations, partly in a form corresponding to the hematogenically spread tuberculosis of the inner organs. Unfortunately we were not permitted to secure this valuable material. What did the Russians know concerning the pathology of tularemia?

BOEHNE: Numerous observations of cases of tularemia during the winter of 1942/43. No fatal case. No examinations of the lymph nodes possible. The epidemic set in with a remarkable fatality among rodents, from which the epidemic could be predicted. Non-specific positive Widal reaction in case of typhus and infection with the titer mounting up to 1:800 also in the epidemic area.

KOEBERLE: After several excisions, I have observed no fistulation following a trial excision of lymph nodes. In all cases, a primary complex could be ascertained; usually it is true, only after conscientious examination of the patients, as the injured place of the skin will often heal quickly and is no longer noticeable. On account of the inspection of histological preparations of patients and animals from America, and of several cases of tularemia from the surroundings of Vienna I am of the opinion that the expert acquainted with the histological clinical picture is in a position to make the diagnosis of tularemia from the autopsy-preparations.

LAUCHE: I think I am justified in summing up the result of this discussion as follows: In cases of tularemia, granulomas are observed, which will chiefly affect the lymphatic tissue, but also may occur outside it in the connective tissue and adipose tissue as well as in numerous inner organs.

The histological picture of the granulomas is characterized by a central necrosis, which, contrary to tuberculous caseation, usually contains numerous leukocytes and nuclear remnants, and often still allows the original structure of the tissue, chiefly of the vascular walls, to be recognized, although only faintly. By this fact, it has a certain resemblance to a gummatous necrosis, though it is considerably softer, which is shown by numerous rents and cracks in the histological section. Around this necrosis, there may be a rather wide and often remarkable regular zone of epithelioid cells (fibrocytes), which is usually arranged radially. This zone occasionally contains numbers of giant cells of the Langhans type. The border between the necrosis and the edge of the epithelioid cells is often vacuolized in a peculiar way (artefacts originating during fixation?). Contrary to tuberculosis, the edge of the epithelioid cells is outwardly surrounded, in most cases, not by a zone of lymphocytes but often by a very hyperemic zone, abundant in vessels, which in older cases, shows the picture of a non-specific granulation-tissue, the capillaries of which penetrate into the zone of the epithelioid cells. Moreover, contrary to tuberculosis, the inflammatory changes extend beyond the region of the lymph nodes to the surrounding connective and adipose tissue. In this zone, which is also highly hyperemic, as a rule, endarterial and periarterial changes are to be observed.

As regards the healing process, we have as yet insufficient knowledge. Apparently, a gradual "organization" of the granulomas will ensue, without encapsulation of the connective tissue.

The differential diagnosis against a secondarily infected tuberculosis is difficult to form. Occasionally, staining of the tubercle bacilli may clarify doubtful cases. In my opinion, however, so far most cases can be diagnosed only as "probably tularemia". The suspicion of tularemia will be confirmed by the quick onset of necroses. Of course, this can be judged only if the duration of the disease is known. Therefore, it is necessary to add precise clinical and historical data when material is sent in for examination. If the serological examination turns out positive, it may support the histological diagnosis. But it must be considered that the positive result may have been caused by a former infection now subsided. It seems to me important to state that a combination of tularemia and tuberculosis especially in the cervical lymph nodes, which are examined most frequently, is apparently not rare.

I request all gentlemen who have the opportunity to make autopsies of tularemic cases to preserve and send in macroscopic material for the War-Pathological Collection.

5. Professor ROESSLE.

6. Pathological anatomy of the effects of detonations.

Doctor WERNER

7. Physical bases of the effects of detonations.

Stabsarzt (Captain, MC.) DESAGA

These lectures were not intended for publication.

IX.

PROCEEDINGS OF THE CONSULTANTS' COMMITTEE ON PHARMACOLOGY

Translation prepared by:

Office of Military Government for Germany (U. S.)
Office of Naval Advisor
Medical Section

Treatment with sulfonamides.
(See Section II, Articles 5 - 10)

Injuries caused by Salvarsan.
(See Section VIII, Article 2)

1. Consequences of chemical warfare.

Oberstarzt (Colonel, MC.) Prof. FLURY

Since the beginning of gas warfare, many erroneous ideas have prevailed even to the present day, and even in medical circles. Incurable lingering illness, tuberculosis, ulcer, and other serious diseases are said to be the inevitable fate of the victims. Nowadays the terror of gas is being revived from wildly exaggerated war-rumors. For this reason, increased importance and urgency is to be attributed to the enlightening of the people on the real state of affairs. In Germany, it was particularly O. MUNTSCH, who undertook this problem.

What do we know today of the consequences of gas-poisoning? What has become known of the fates of the victims of gas-war? What can be regarded as certain? What remains obscure even now? The war-archives and official sources are often still inaccessible. But there is available abundant statistical material from various countries. In Germany, valuable material has been lost, so we have to draw on foreign sources to a large extent.

It need not be proven in detail that it is the organs of respiration that are injured most by the inhalation of gas. It is chiefly the respiration system that the gases will attack.

The organic pulmonary injuries, particularly the diminution of the respiratory surface and its significance for the later consequences may be somewhat generally overestimated. The injuries to the upper respiratory tract and to the lungs by the different groups of gases are easily intelligible as regards cause, course, and consequences and raise no particularly intricate problems. Here, the connections are clear and easy to see.

The diseases of the nose, of the accessory sinuses, of the larynx, and of the trachea, as they manifest themselves particularly with the "Yellow-Cross"-group (mustard gases), have been observed a thousand times and are well-known. In the case of serious injuries to the mucous membranes of the upper respiratory tract, atrophic changes and formation of tumors, particularly in the larynx, will predominate. The cases of bronchitis are seldom due to the effect of the gases. They are rather consequences of bacterial infection. I am not going to mention here in detail the consequences of pulmonary edema and of chronic bronchitis with their complications and subsequent effects, emphysema, atelectases, bronchiectases, bronchopneumonias, diseases of the pleura, formation of empyemas, abscesses, pulmonary gangrene, callosities, septic states, and bronchiolitis obliterans.

According to almost general opinion, pulmonary complications are said to be the most frequent and numerous ones. This certainly seems to be natural and self-evident, but some questions still need further explanation.

Probably the greatest problem of post-war time concerned the possibility of pulmonary tuberculosis being a sequel of gas-poisoning. In the course of time, the opinion underwent considerable changes.

During the first World War, the opinion was widely spread that serious local pulmonary injuries by gases were liable to result in tuberculosis to a large extent.

In post-war time, enormous efforts were made to settle this question. A long series of researches and statistical inquiries aimed at clearing up the matter, particularly because of the problems of pensions and providing for the victims. Thus, extensive inquiries were made in the various countries, on the one hand about men actually or ostensibly injured by gases, on the other hand, about veterans suffering from pulmonary tuberculosis concerning possible previous injuries by gases. The statistics comprise more than 100 000 cases. Investigations concerning 70 000 gas-cases of the Americans and more than 22 000 cases checked by the English Veterans' Administration rank foremost. Thousands of those patients were re-examined later on. The result was amazing: the proportion of men suffering from tuberculosis was much lower than expected. Among the 70 000 Americans mentioned, chiefly gased by "Lost" (Mustard gas), there were but 173 cases of tuberculosis, that is 0.24 per cent.

The possibility of tuberculosis being revived by the effects of gases is generally admitted. Many medical men are of the opinion that gas-poisoning alone is not sufficient to cause tuberculosis and that rather a general predisposition or circumstantial conditions are necessary. Among men injured by gases, pulmonary tuberculosis does not occur more frequently than among the bulk of the war veterans. A clinical picture resembling tuberculosis to a large extent, but with negative bacilli findings, has been described as pseudo-tuberculosis (ACHARD).

As mentioned before, disorders of respiration (dyspnea) are the most conspicuous symptoms. If there are distinct injuries to the respiratory organs, these disorders are not difficult to explain. On the other hand, the occurrence of chronic respiratory trouble is not so easy to understand. This applies particularly to the primary cause of shallow, rapid respiration, which is observed very often. Several theories were formed as to its origin. The possibilities of a circulus vitiosus developing are abundant here. One could imagine that in consequence of the local injury to the respiratory organs by the gas a permanent state is caused, which is characterized by lack of oxygen, chronic anoxemia; which in its turn is liable to have various consequences for the entire organism.

Even in the subsequent states, we must ascribe a much more important part than has been so far customary to disorders of the circulation. Apart from complications of the lungs, with a vast majority of the patients, disorders of the cardiac functions, particularly tachycardia, are the chief symptoms. This is regarded over and over as the main symptom of the sequelae. Besides, shortness of breath is most frequently observed and usually sets in at night. Also in judging late injuries, respiration and circulation together must be considered as an inseparable whole. Experience on the part of the Germans at the front and in the home country, at ammunition-dumps, chemical factories, even scientific institutions showed again and again that, above all, functional disorders of the heart and of the nervous regulation system will occur after gas-poisonings. But in spite of abounding subjective complaints, there are at first mostly only few or no objective findings whatever. With late injuries of this description, all symptoms of respiration due to altitude before adaptation (mountain sickness) were observed. Here also, there is a chronic lack of oxygen in the blood, a chronic anoxemia. It is caused by the rapid shallow respiration of the patient. Thus, the lungs are but insufficiently supplied with air. This concept is confirmed by the positive, by no means temporary successes of the English, who made the patients live and particularly sleep in oxygen-chambers for some time and arranged small oxygen-tents over their beds.

In judging the consequences of gas-injuries, two notions played an important part in the English and American Armies: the irritable heart, and the effort syndrome. These two diagnoses rank foremost among the often very violent late consequences. The irritable heart corresponds, to a certain extent, to that of "cardiac neurosis", the "cor nervosum".

The effort syndrome comprises the changes of pulse after a short physical strain, which chiefly consist in quick acceleration of the pulse and delayed return to the normal rate.

War gases are not specific heart-poisons; nor is the irritable heart to be regarded as a specific cardiac disease, particularly not as cardiac insufficiency. Besides, it is by no means a specific disease of soldiers.

Real organic injuries of the heart, however, will also occur not infrequently. Myocardial injuries may be caused by war gases as well as by other suffocating poison-gases, such as carbon monoxide, carbon dioxide, nitrose, sulphuretted hydrogen, carbon bisulfide, prussic acid, etc. (ADELHEIM, WOHLWILL). When they arise, they always imply complications by infection. Sudden late deaths by gas-injuries, which were occasionally observed, are to be explained by the formation of thromboses with embolism or cardiac infarcts. It appears, however, that serious permanent injuries to the heart by war gases are not so frequent as is sometimes assumed. It is not positively proved whether some particular war gases, such as Lost (mustard gas), cause particularly frequent or particularly severe cardiac injuries.

The injuries to the skin by war gases show a remarkable resemblance to certain injuries caused by radiation. The formation of pigment by Lost reminds one of the effects of light. Common to both are the sensitivity and susceptibility to injuries of every description, which will often prevail for a long time, as well as mechanical traumas and infections by cocci. Old scars caused by Lost are said to be highly sensitive to changes of the weather. Patients are susceptible to eczemas, furunculosis and abscess formation, to symptoms of hypersensitivity of various kinds, to urticaria, dermatitis and vascular injuries; during the healing process recurrences, particularly furuncles, will often occur.

Allergic states of various kinds caused by war gases, particularly by Lost and arsenic gases, were frequently observed.

The injuries to the eyes are of a particular interest, beyond the general medical one, since they afford a deeper insight into the very nature of the effects of war gases and, moreover, elucidate the late consequences in a new and surprising manner.

In the weak concentrations used in the field, the group of the gases irritating the eyes ("White Cross Tear Gases") is comparatively harmless, in more concentrated, particularly liquid form, however, they may cause serious injuries, even the loss of the affected eye.

The eye is highly sensitive to Lost and analogous gases. The serious acute injuries shall not be discussed here. As regards late consequences, I make the following remarks: Direct involvement of the anterior parts of the organ of vision, the lids, the conjunctiva, the cornea causes either a temporary inflammation without formation of permanent scars or atrophic changes with scar formation. The injured cornea too may become the place of entrance of the agents of infection. A secondary infection creates further complications. Chronic inflammations of the conjunctiva with states of irritability, photophobia, intensified lachrymation, and various disturbances of vision occur most frequently. The manifestation of these consequences is furthered by previous eye diseases, particularly trachoma.

Another group of eye-injuries is due to the consequences of the resorptive poisonous effect; indirectly through the blood, grave disorders of the circulation and not rarely of the vessels arise. They manifest themselves chiefly in the lower parts. To this group belong the hemorrhages, thromboses, ambolisms, injuries to the retina and to the choroid, and night blindness. Thromboses of the veins and embolism of the central artery have in some single cases led to blindness.

The problem of permanent blindness may be regarded as settled today. Here also, the apprehensions much exaggerated at first gave way to a more optimistic conception. The number of men made blind by war gases is small, they form

only an inconsiderable part of the men injured by war gases during the World War. Of the 3 000 Germans blinded during the first World War, only 81 were injured by war gases. But it appears that we must somewhat check our optimism also as regards late consequences affecting the eye. Here too, we observe a change in judgement.

The view, expressed particularly often in German literature, that serious consequences affecting the eye are extraordinarily rare, cannot be supported any longer. In any case, it must be modified. Recently, there have been continually increasing reports of diseases occurring very late and usually taking a serious course, of the so-called "recurrences".

In numerous reports, cases are described, in which renewed diseases of the eye occurred 4, 6, 10, 12, 15, 17 and even 19 years after the injury caused by Lost during the first World War. In many cases, no visible corneal injury, particularly no opacity is said to have existed, sometimes, however, there has been increased sensitivity and predisposition to eye-diseases even before the first injury. There were partly infectious processes, partly recurrences said to have set in without any visible infection. The following manifestations are described: keratitis, kerato-conjunctivitis, corneal opacity, leukoma, corneal degeneration, corneal tumors, perforation and panophthalmia. Particularly emphasized are peculiar changes of the corneal vessels; enlarging (vascular varices, "mustard-gas varices"), forms similar to strings of pearls, abnormal vascular formations, new formation of vessels and vascular germs. The conjunctivo-limbal syndrome is said to be caused by derangement of the alimentary functions of the marginal network. The most frequent diagnosis is that of "keratitis neuroparalytica". It is remarkable that this disease is always compared to the injuries caused by X-rays. As with the effects of radiation, there is also here, a remarkably long period of latency.

The observation that simultaneously with the late consequences affecting the eye recurrences are said to occur in other mucous membranes previously injured, particularly the bronchia, is of more general importance.

Besides these the war gases cause various general diseases, among them allergic states.

The effects on <u>metabolism</u> show the characteristics of injuries by war gases in a particularly impressive way. This applies, above all, to the "Yellow Cross" group.

Marked loss of weight is one of the regular symptoms of the late consequences, caused also by gases of other groups. The patients rapidly lose weight, show a pale, sallow complexion, also slight formation of edemas and their power of resistance is weakened. Marked loss of weight is also observed after phosgene and arsenic compounds. But with the "Yellow Cross" group, the disorders

of metabolism are the most lasting. The organs of digestion are nearly always affected. Cases of gastritis are frequent. The problems of intestinal tumors and of hepatic injuries are still unsolved.

There is no positive proof of the occurrence of specific metabolic diseases. Genuine diabetes can be no late consequence, since it depends on the constitution and hereditary disposition. Glycosuria, observed after gas-poisoning, also after infectious diseases, has nothing to do with genuine diabetes mellitus.

The war gases also affect the blood and the blood-forming organs. Anemias occur very often. As also pernicious forms will occur after grave poisonings and infections, there may be a connection, particularly with Lost and arsenic compounds, if sufficiently proven by previous history, similar symptoms, and expert findings.

Let us now turn to the nervous system. In the beginning, particularly during the first World War, nervous disorders except local effect of irritation were but little heeded, though serious effects of war gases are very often connected with various disorders of the nervous system, even with long unconsciousness. The late consequences will chiefly affect the nervous system. In many thousands of re-examinations "neurasthenia" was diagnosed. War gases will affect all organs of sense and by no means the eye exclusively. Disorders of the olfactory sense, of the sense of taste, of the sense of hearing, of the tactile sensitivity, of the equilibrium are often observed. Various cases of neuritis are not rare. Distinct neurological symptoms, however, are apparently not very frequent. Psychic disorders after injuries caused by war gases are by no means as rare as is usually supposed. Depressions, hysterical-hypochondriacal states ("gas-neuroses, gas-psychoses") are described above all. But in the judgement of nervous symptoms, particularly of cerebral and mental diseases after gas-injuries, the greatest caution and reserve is recommended. Isolated cases of paralysis, parkinsonism, epileptic states and the like are known, but they are very rare. Even schizophrenia has been associated with previous injuries by war gases.

Among the unsolved problems, the question of permanent injuries to the vegetative nervous system by lipoid soluble, highly active war gases are not the least. These are probably also responsible for disorders of the regulations of respiration, circulation, cardiac action, of the extracardial cardioneural system, the various injuries to the vascular nerves, for loss of tonus in the periphery and centers. Lastly, they are supposed to play an important part in metabolic disorders. As regards the question of judging, I have to say:

It is often very difficult to answer the question of connection, that is whether the disease in question was positively or probably caused by a previous war-gas injury.

The main bases are formed by the proven facts, by the record of the patient, and by the results of the examination. A strict critical examination of the data and evidence is particularly important here. Just as in any problem of providing care following accidents, the primary injury, in this case the injury caused by war gases, must be positively proved. Secondly, there must be proof that the injury was liable, also as regards the various circumstances, to cause the subsequent disease or to make a disease already existing worse. The kind of injury, the severity of the case, e.g. serious pulmonary edema, long unconsciousness, possibly also localization are essential for the opinion. Thirdly, the temporary circumstances must be known. They must correspond to experience and knowledge concerning the occurrence of the late consequences in question. The judgement becomes difficult, often absolutely impossible, if related symptoms are lacking or indistinct. In this connection the recently observed late injuries to the eyes, which will appear even decades afterwards, are significant. On the other hand, it was often ascertained, that severe war-gas injuries, e.g. diseases caused by phosgene with pulmonary edemas, healed without leaving behind any consequences clinically traceable.

At all events, the greatest caution and reserve seems to be imperative in the judgement of all diseases not occurring until many years after the war or the war-gas injury, of diseases depending on predisposition, of rare diseases and those of unknown origin. The war-gases will generally cause no new specific forms of disease characteristic of them, nor any specific consequences. Nearly all symptoms occurring after war-gas injuries may have other causes as well.

In German literature, the enormous difficulties of the subject have been pointed out over and over again, particularly by O. MUNTSCH. Even if matters are examined again, the principles elaborated by that author in many publications retain their validity. Nor have any new particulars been found out as regards the subsequent states during the last few years. The same applies also to their prevention and treatment. With respect to subsequent diseases of long duration with their psychic effects, psychiatrical treatment is of particular importance.

Discussion:

Referring to experiences of his own, HEUBNER points out the credulity of patients and surgeons with regard to a connection of ostensible absorption of a poison and a disease.

WIRTH: Points out the difficulty of the problem of a connection between the effects of war gases and pulmonary tuberculosis. Several times, this question has been the subject of inquiries with internists and experts for tuberculosis, but no solution could be found. The connection between the effects of war gases (arsenic) and paradentosis is equally doubtful.

LENDLE: Asks whether a non-specific susceptibility to eczemas will prevail even if there was only one exposure to Lost. He indicates the operative treatment of eye injuries caused by Lost (transplantation of the labial mucous membrane), in order to preserve the vascular supply.

ORZECHOWSKI: The late consequences affecting the eye are probably injuries of combination. "To get accustomed" to "Blue Cross" gases is rather a tachyphylactic reaction. The difference of dyspnoea from tachypnoea is significant for the treatment with O_2.

SOEHRING: In a patient injured by Lost, who was not primarily treated, double vision and temporary paralysis of the ocular nerve set in 4 to 5 weeks afterwards. The connection is obscure.

WERNER: A permanent late consequence of injuries caused by Lost is the often occurring allergy, which is accompanied by a violent cutaneous edema in the face and limbs and by violent eosinophilia.

GREMELS: Points out the importance of the administration of sufficient oxygen after the effect of war gases injurious to the lungs. Morbidity by tuberculosis after the effect of war-gases injurious to the lungs, which amounts to 3 to 4 per cent, appears to be less than the morbidity by tuberculosis among the civilian population.

Directions concerning the sequelae of injuries caused by war gases.

As regards the sequelae, the following can generally be observed: Most injuries caused by war gases will heal completely or leave a scar. Only a comparatively small number of them will leave behind late injuries. Contrary to wounds, complete invalidity is extraordinarily rare with them.

The sequelae in question and known until the present may be divided into two large groups. On the one hand, there is a series of clinical pictures frequently occurring immediately after injuries caused by war gases, where the connections are clear and easily understood and therefore generally acknowledged. On the other hand, there are large numbers of most variable diseases, in which the connections are more or less doubtful and which are therefore disputed.

Today, the principal sequelae generally acknowledged have been thoroughly investigated clinically and scientifically. After the inhalation of war gases, three types of late sequelae are generally distinguished. In the first group, the diseases of the organs of respiration, above all chronic bronchitis and emphysema, rank foremost. The second group comprises disorders of circulation, chiefly so-called

functional diseases, such as cardiac neurosis and extra-cardiac disorders of regulation. Disorders of the heart and of the circulation are more frequent than was formerly supposed. As a rule, they are only visible during functional strain. The third group of symptoms consists of permanent states of disease which manifest themselves chiefly in the nervous system and are generally referred to as "neurasthenia". In the literature, now one group, now the other is mentioned as the most frequent or most important sequela. This contradiction is probably due to the different time of judgement. The respiratory tract is injured first; infections and other complications ensue, thus gradually producing disorders of the circulation. Lastly, various general injuries are observed as sequelae of a chronic deficiency of oxygen: above all, functional disorders within the whole nervous system, and disorders of blood-supply and nutrition of varied description. If war gases affecting also the skin and the eyes are involved, there appear, of course, additional late injuries to these organs.

Besides the typical forms of disease mentioned, which set in with a certain regularity, there are other possibilities, accidental disturbances, atypical sequelae as it were, to be reckoned with. Above all, the sequelae of vascular injuries, hemorrhages, thromboses, embolism, belong to this group. More rare accidents of that kind are for instance gangrene of the extremities, sudden blindness by a closing of the central vessels of the eye, otitis media, perforation of the tympanum or the nasal septum, unexpected late deaths due to apoplexy. Pulmonary tuberculosis, too, belongs to the sequelae. It is, however, not more frequent with soldiers injured by gas warfare than among other participants of the war. The greatest reserve is necessary, particularly if ostensible late injuries do not manifest themselves until long after the injury caused by the gas, that is many years after the war; particularly also if rarer diseases are concerned or such diseases the origins of which are not known at all or only imperfectly. The same applies to all diseases depending on a particular predisposition. So, the data concerning connections with injuries caused by war gases are very doubful, partly absolutely obscure, with cerebral and mental diseases, with metabolic disorders such as diabetes, with dental and oral diseases, such as paradentosis, with malignant new formations such as bronchial carcinoma, gastric carcinoma, skin carcinoma and with diseases of the excretory organs, chiefly the kidneys. A moot question is also the connection with the frequent diseases of the organs of digestion, particularly gastric tumor; besides hepatic atrophy, diseases of the blood and rare diseases of the skin. The majority of the veterans afflicted with these late diseases are rare individual cases concerning which no generalization can be made. Hardly ever could it be positively ascertained whether the diseases were really sequelae of war gas injuries. Sequelae must be judged with great caution, since war gases may eventually affect any organ of the body and any function. All the same, the number of the diseases

which are to be recognized as late sequelae must be restricted as much as possible. It is essential for the judgement that a primary injury caused by war gases is positively determined. Then this primary injury must have been liable, considering the circumstances, to cause the disorder in question. Related symptoms must be required on principle. Difficulties may arise here by the very striking observations recently made, according to which recurrences affecting the eye, particularly corneal injuries, may occur very late, even after many years, even decades. One must bear in mind that this is no isolated symptom limited to the organ of vision, but that similar "relapses" may possibly occur with other organs as well.

Without thorough knowledge and great experience in the special subject, any safe judgement of these consequences is hardly possible. Even if during the last few years, nothing absolutely new has become known as regards the particular subsequent states, it is urgently desired that the experience available so far should be collected and adequately utilized by a central authority.

The different war gases of the groups of phosgene and Lost do not differ very much as regards the sequelae after inhalation. All the same, there are generally certain differences as to the violence, the local extent and the temporal course of the late sequelae. According to prevailing opinion, which is by no means uncontested, the most severe sequelae are caused by the "Yellow Cross" gases. It is also with these that healing takes the longest. Lewisite and similar compounds of arsenic are supposed to range between the groups of phosgene and Lost.

The <u>treatment</u> of late sequelae in men injured by war gases is generally the same as that of corresponding diseases from other causes. The task of the surgeon does not end with the healing of the acute poisoning, such as the pulmonary edema and its primary effects. A particularly important task is that of strengthening the patient's will to work, his capability for work, and his will to recover, principally by influencing the entire personality. It is just with the prolonged subsequent diseases with their psychic effects that the psychic treatment must not be neglected. The remaining therapeutic possibilities are various. Here, a large field opens to medical activity. Here also, the approved physical, dietetic, climatic, and medicinal methods, if necessary surgical intervention, are to be considered. The chief aim remains the complete recovery of the patient. It is attained more frequently with war gas injuries than with many other war-injuries. It will be possible to attain it more easily in the future than during the first World War. Today, the surgeon is assisted by much new knowledge and experience, and not least of all by a much wider foundation in the judgement of late sequelae.

2. Toxicology of explosives.

Professor HEUBNER

I. General.

It is known sufficiently well that most of the modern explosives are compounds of nitric acid, either aromatic nitro compounds which are formed by the release of hydroxyl from nitric acid and of hydrogen from the benzol-nucleus, or nitric esters of multivalent alcohols, which are formed by the release of hydrogen from nitric acid and of hydroxyl from alcohol. During the last few years, particular attention and research work has been paid to the following compounds: metadinitro-benzol, trinitrotoluol, dinitro-anisol, hexanitro-diphenylamine, hexogen, dinitroglycol, and dinitrodiglycol. The first four are aromatic nitro compounds and solid substances, the last two are nitric acid esters and oily liquids such as nitroglycerine. Hexogen, as a nitramine, has a particular chemical character, but essentially it is more nearly related to the derivatives of nitrobenzol than to the esters; it is a solid substance, too.

These explosives are often used not in their pure forms, but mixed with each other or with other non-poisonous substances.

II. Dinitrobenzol.

As is known from the last war, the simplest of the mentioned nitro compounds, that is dinitrobenzol, is of the most practical importance, viz. it is particularly liable to cause poisonings. For this reason, poisoning with this substance has been recently studied most. It is considerably more poisonous than mononitrobenzol, but also more poisonous than trinitrobenzol. Its volatility is so great that its vapors are easily inhaled under the conditions of the manufacturing and filling works and that even the higher temperatures of summer considerably increase the danger of poisoning. On principle, a difference must be made between an acute and a chronic poisoning, though there are virtually all kirds of transitions and mutual relations.

A. The most remarkable symptom of acute poisoning is the formation of hemiglobin (methemoglobin), which manifests itself objectively in a cyanotic coloring of the skin and the mucous membranes with a gray tinge, subjectively in weariness, weakness, headaches, and similar general disorders.

In m-dinitrobenzol, the effect of methemoglobin is more lasting than in any other nitro compound examined in this respect; for this reason, a cyanosis once set in will abate comparatively slow, that is only after some days. Danger to life by anoxemia will only occur if more than 60 per cent of the hemoglobin has been changed into methemoglobin.

B. A second symptom, which may occur even in a single, that is acute poisoning, but which becomes virtually important only after repeated doses, is the formation of Heinz-bodies. They are demonstrated best by so-called "vital staining" with Nile blue or brilliant cresyl blue, but can be recognized also in the unstained object. These formations were often called "hemoglobinemic inner corpuscles which is wrong in two respects: the Heinz-bodies are neither inside the erythrocytes nor do they consist chiefly of hemoglobin; they are rather products of coagulation in their shell. They are formed within the circulating blood, grow, in the course of time from submicroscopic dimensions to larger button-like appendages, change neither the osmotic resistance nor the oxygen capacity of the erythrocytes, but cause their premature reduction after being absorbed in the spleen and the liver; in fatal cases and in the animal tests, a good many erythrocytes with Heinz-bodies capable of being stained will be found accumulated in large phagocytes of the spleen and the liver.

This corresponds in the living patient to the appearance of reticulocytes in the wake of the Heinz-bodies, or, in case of a discrepancy between accelerated blood-reduction and regeneration, to the development of a hypochromic anemia. It is easily understandable that this will occur particularly in case of the repeated or permanent influence of dinitrobenzol: for this reason, anemia is the most important clinical symptom of chronic poisoning. On the other hand, there are, of course, also cases of rapid decomposition of the blood with great changes of the red and white blood count, pleiochromic icterus, pathological urinary findings and late death.

C. Rare though possible is a third change affecting the blood, which is of diagnostic rather than prognostic interest; the formation of verdoglobin, an oxydation-product of the blood pigment, which is green in its pure state; like hemoglobin, it colors the skin and the mucous membranes cyanotic. But its formation is usually confined and will never get a decisive influence independently besides the two changes mentioned before.

D. The development of a disturbance of the hepatic function is rare, too. It will mostly be difficult to differentiate between hepatic symptoms caused by blood-decomposition and those caused by direct toxic injuries to the organ. As regards tests of the hepatic functions, it can be stated that, in case of icteric color of the skin, the Takata-Ara test may have a positive result. Animal tests on rats and dogs by the method introduced by FELIX (secretion of the p-oxyphenyl pyroracemic acid) yielded variable results: with some of the chronically poisoned animals, the quantity of secretion distinctly rose shortly before their death, but by no means in all fatal cases, and never in the earlier stages of the poisoning:

E. After imbibing moderate quantities of alcoholic beverages, a sudden appearance of symptoms of poisoning has often been observed, which was a long time considered to be identical with the direct effects of dinitrobenzol. Since these symptoms, however, often became manifest at late hours and at inns, as it is easy to understand, the initial symptoms were obviously observed but seldom by surgeons or even examined by clinical methods. More exact background investigations recently made as well as animal tests, however, led to a different conception: these symptoms are rather effects of the alcohol in a changed organism, so that the character of these effects is considerably intensified and also changed. After doses of alcohol otherwise harmless, there occur congestions of the blood in the head, giddiness and states similar to collapse with convulsions; a cyanosis, possibly pre-existing, becomes much more apparent, which evidently is to be attributed to a disorder of the circulation. This also accounts for the fact that these pictures of poisoning will generally not occur in the factory, viz. under the direct effect of the explosive, but after leaving work, even on a holiday etc.

In animal tests on rats, though not on dogs, this picture of poisoning could be reproduced, though with individual variations.

F. The recent experiences in therapy in case of poisonings by dinitrobenzol are to the effect that a threatening increase of hemoglobin in the blood may be easily checked by methylene blue, and that is most suitably given by peroral doses of about 5 grams. (Intravenous doses - ten times smaller - may be suitable for instance with unconscious patients, but they have only a temporary effect and must be repeated, therefore, according to circumstances). In the stage of anoxemia, respiration is, of course, beneficial, too.

With the more frequent chronic poisonings, many of the recommended and tried remedies did not prove efficacious not even iron- or liver-treatment of anemia. Several weeks' leave always proved to be the best remedy. Regular supply of vitamin compounds (ascorbic acid, aneurin) had no effect in the animal test, but it seems to increase the workers' power of resistance to poisoning.

III. Trinitrotuluol (tritol).

This substance is much less poisonous than dinitrobenzol; according to animal tests, about four times the molar dose is needed to produce the same quantities of methemoglobin, but even then, the constancy of the formation of methemoglobin is considerably shorter; in addition to this, the extent of the formation of Heinz-bodies is perceptibly smaller. The main reason for this difference is the presence of a methyl group at the benzol-nucleus, which delays the reduction of the nitro compound to the direct toxic compound (or to the majority of such compounds). (The dinitrotoluols are still less poisonous than trinitrotoluol.)

This explains why this substance is usually treated with much less caution than dinitrobenzol. On the other hand, the difference in the effect upon parenchymatous organs, particularly the liver, in comparison with dinitrobenzol does not seem to be so great as in their effect on the blood. At least it was observed that in equal or even smaller degrees of cyanosis or anemia, the symptoms of a hepatic injury, such as increase of bilirubin in the serum, increase of urobilinogen and urobilin in the urine, finally also pathological values in the liver function test according to FELIX, will occur to a higher percentage after handling trinitrotoluol than after handling dinitrobenzol. Also serious hepatoses with danger of life by acute yellow atrophy were registered much more frequently.

In tests with rats and dogs, investigations of the function according to FELIX also yielded more distinct positive results with trinitrotoluol than after dinitrobenzol. Besides, determination of blood sugar after doses af adrenalin and direct analysés of the hepatic glycogen of rabbits indicated a hepatic injury.

The principles mentioned in the therapy of injuries caused by dinitrobenzol including the elimination of alcohol also apply to the therapy of trinitrotoluol. The danger to the liver requires a diet rich in carbohydrates and sufficient in calories, as well as a rigorous restriction of the drinking of alcohol, also from that point of view.

IV. Dinitroanisol.

No disorders caused by this explosive have been observed in men as yet, though it proved very interesting in the animal tests.

V. Nitro explosives locally irritating.

In professional-hygienic respects, some nitro explosives are remarkable by the fact that they cause local irritation, that is to say they cause erythemas, dermatitis, also eczemas. To this group belongs a frequent by-product of technical trinitrotoluol: tetranitromethane. Other substances of this group are: di- and trinitroanisol, mono- and dinitrochlorbenzol, and lastly, hexanitrodiphenylamine (hexa).

VI. Hexogen.

Hexogen is no derivative of benzol, therefore it has a toxicological character of its own, according to its different chemical structure. The substance is solid, not easily soluble and does not evaporate easily; only if inhaled as dust, will it cause poisonings. Despite the nitro groups contained in the molecule, no pathological changes in the blood are observed, but exclusively central symptoms; headaches, giddiness, vomiting, also stomach aches; these are accompanied by fits of sudden fainting, which will set in quite unexpectedly at

different times of the day, often out of working hours, even when the patient is feeling quite well, and which may last from minutes to hours. If the patient was heavily exposed, spasmodic fits, at times even delirious fits, will occur.

In the animal test, the most striking picture of motor spasms of partly clonic character prevails. These spasms may be of the utmost violence and may return for many hours (with intervals) after a single sufficient exposure. Often, injuries and biting of the tongue will result. Besides, bradycardia as a consequence of vagus-irritation, vomiting, salivation, incontinence of urine and defecation, at times hyperglycemia with subsequent hypoglycemia are observed. According to the dose, death will occur more or less early by central paralysis or exhaustion, and without any fixed rule either during a spasmodic fit or in an interval between the fits. The fits can be suppressed by analeptics (sleeping drugs) as long as they are effective, or by preventive treatment with bromides.

VII. Nitroglycols.

Theoretically and practically a strict discrimination must be made between the group of aliphatic nitric acid esters and the aromatic nitro compounds. In the picture of the symptoms of poisoning caused by the former, the effect upon the blood, which depends on the nitric acid ester, are preserved, it is true, but the effect upon the central nervous system, which depends on the aromatic nucleus, is completely absent; also with respect to the parenchymatous organs, these substances are much less dangerous than the derivatives of benzol. There is perhaps a connection between this fact and the fact that possible changes in the blood of the same extent are more easily tolerated and overcome.

In practice, these esters disturb the physical health by an effect, which is limited to and characteristic of them, viz. the distension of the vessels, which manifests itself in congestion of the blood in the head, headaches, weakness, and collapse, owing to the lowering of the blood pressure. In case of repeated exposure, increased excitability and sleeplessness were observed, too.

On principle, every surgeon is familiar with this effect by the therapeutic use of nitroglycerine (rather glycerol trinitrate). But as a derivative of the trivalent alcohol glycerine, this explosive evaporates so little, that no effective amount of it is inhaled in industrial technics. On the other hand, the corresponding derivative of the bi-valent alcohol glycol, viz. "dinitroglycol" or rather glycol dinitrate, is considerably more volatile, so that larger amounts may easily penetrate into the body with the inhaled air. Effective amounts of the substance also penetrate easily through the skin, as was observed, among other things, even during the tests with this substance by the resulting effects (headaches, giddiness, nausea). Taken on the tongue one drop will be sufficient with most persons to cause these symptoms, with subsequent vomiting and weakness in some persons.

It is possible to get accustomed to that to a certain extent, but not for any length of time. After pauses in work (holidays), when work was resumed, the effect was often felt more strongly than before.

On principle, glycol dinitrate can also produce methemoglobin and Heinz-bodies at a particularly striking rate and freely, as numerous animal tests have shown. The amount of methemoglobin is in a stoicheiometric proportion to the dose and does not exceed the monomolecular proportion. Heinz-bodies can be traced in the blood even as early as 20 to 30 minutes after a dose was administered; besides, they can be easily preserved even in vitro by this substance. An amazing fact is the complete good health of the animals while all their erythrocytes carry Heinz-bodies. Anemia will occur as a rule, but mostly with a delay, or it may even partially disappear at times despite continuous doses. The power of regeneration of the hemopoeitic system is evidently not at all impaired, a fact supported also by the large number of reticulocytes.

Mononitroglycol is in every respect much less poisonous than dinitroglycol, which affords quite an interesting parallel to mono- and dinitrobenzol. Despite considerable qualitative conformity, dinitrodyglycol is likewise several times less poisonous. All the same, this substance also will cause in men disturbances similar to those caused by the more volatile dinitroglycol.

By all experiences, including investigations of foreign scientists, the impression is strengthened that, for the effect of dilating the vessels of the nitric acid esters, neither a saponification of the esters nor a reduction to nitrous acid esters is necessary, but that it is rather the esters themselves that are effective.

Discussion:

FLURY: In nitro factories, there often occurs violent discoloration of the skin and distinct cyanosis in workers without any subjective complaints. Report of a fatal case after resorption of nitrobenzol through the skin.

LENDLE: Question, whether nitro compounds may not form dark colored substances with hemoglobin and thus create the erroneous impression of a more violent cyanosis. Experiments made by HEISE towards influencing the amount of ascorbic acid in the tissue and the treatment with ascorbic acid, which yielded a negative result, are mentioned.

WIRTH: Mention is made of tests made by PENDL at the Institution for Pharmacology and Military Toxicology of the Military Medical Academy, which even in case of fatal poisoning of rats by dinitrobenzol showed the life-preserving effect of oxygen inhalation.

DIENENMANN: Why is intravenous supply of oxygen not used more in Germany?

WIRTH: The danger of embolism is too great. In case of subcutaneous application, the amount of oxygen which can be supplied, is too small.

GREMELS: Points out the inefficacy of intravenous infusion of oxygen.

KLIMMER: Are any particulars known about the retrograde change of methemoglobin to hemoglobin?

HEUBNER: As to human beings no experimental results are known. Complete retrograde change in poisoned rats occurs after 3 to 4 hours, in poisoned cats after 7 to 8 hours, in human beings probably after 5 to 6 hours.

The theory of KALLNER about a form of cyanosis, which is said to be caused by saline linkage of substances like acetanilide, sulfanilamide, etc. to carbhemoglobin, was examined by Dr. GAEDE in two ways: firstly, the most important test-tube experiments of KALLNER were repeated, but with absolutely negative results. Above all, the difference of color described by him was not found (depending on the introduction of carbonic acid into the blood sample); even a consultation with KALLNER by letter about particulars of the method did not yield the same results. Secondly, blood was drawn with all precaution from a number of clinically observed cases of cyanosis and this blood was quantitatively analysed as to its contents of methemoglobin (hemiglobin), verdoglobin (sulfhemoglobin), reduced hemoglobin and total blood-pigment by aid of light-absorption in the apparatus of HAVENANN, and of oxygen-supply in the vanSLYKE-apparatus. In all cases, 20 so far, the color of the blood corresponded to that which was to be expected according to the analysed composition. We therefore have no reason to accept the supposition of the presence of further pigments as proposed by KALLNER, in order to explain the cyanoses, but are rather of the opinion that they are always due to reduced hemoglobin, methemoglobin, verdoglobin, or a mixture of them. Nothing definite can be said as yet with regard to the occurrence of verdoglobin (sulfhemoglobin) in workers occupied in the manufacture of explosives. But since the occurrence of verdoglobin after large acute doses of dinitrobenzol was found in animal tests, I thinkit possible that, just as after chronic use of acetanilide or phenacetin, also after the absorption of explosives, there are cases carrying verdoglobin in the blood for a long time. As far as we know, verdoglobin is never significant for the elimination of the blood pigment as a transmitter of oxygen, but it is important for cyanosis, since the pigment, even in much less concentrated form, colors the blood very dark. It is absorbed much more in hemoglobin than in methemoglobin (hemiglobin).

Without particular influences, the reduction of methemoglobin (hemiglobin) will proceed comparatively quickly, that means within a few hours. Of course, this does not apply if the poisonous system, which forms methemoglobin (hemiglobin), is constant for a long time, which is evidently the case with dinitrobenzol.

Therapy with oxygen is useful only in case of intensive formation of methemoglobin (hemiglobin). Then, however, it is to be recommended; subcutaneous or intravenous injection of oxygen is always insufficient quantitatively and besides, it is dangerous and must therefore be rejected.

Directions concerning toxicology of explosives.

1. Choice of workers:

In factories producing and manufacturing explosives, no persons with previous diseases of the liver or anemic states, nor drunkards nor pregnant women may be employed or, if so, they must be discharged.

2. Prevention of the absorption of poisons.

With substances dangerous in the form of dust (hexogen): the explosives must be moistened, etc.

With volatile substances (such as dinitrobenzol, glycoldinitrate): adequate ventilation-system, particularly during the hot season; careful control of the protective clothing, above all of the protective gloves; strict carrying through of the changing of clothes before leaving the factory and enforcement of bathing.

3. General measures:

Avoidance of alcohol.

Satisfactory general nutrition, if necessary the addition of vitamins, particularly C and B_1.

4. Therapy:

A. Aromatic nitro compounds:

In case of trouble due to formation of methemoglobin (weakness, headaches, shortness of breath under strain): oxygen-respiration (particularly if life is endangered); intravenous injection of methylene blue (up to 0.5 grams), it is advised to administer a subsequent oral dose up to 5 grams; if the danger is less imminent, the oral dose alone is sufficient; slighter cases of cyanosis require no therapy.

In case of anemia, the usual treatment with iron, even liver preparations is usually less beneficial than temporary removal from the factory (several weeks' leave). Milder cases need not cause incapacity for work.

The usual symptoms will reveal no endangering of the liver, as decomposition of the blood may occur. Repeated execution of the Takata-Ara test is recommended, and if possible, the function test according to FELIX.

B. With glycoldinitrate and similar substances, the main symptom is lowering of the blood pressure with giddiness, headaches, and weakness. By accommodation these symptoms will often be overcome. After temporary interruption of work, at times even after a Sunday, the complaints at first reappear more intensely. Symptomatic therapy will be sufficient.

For further instructions consult "Directions for the Protection of Health in the Manufacture of Explosives" and the attached instructions for surgeons as elaborated by the National Health Office and published in the National Labor Bulletin on 20 January 1941 by the National Secretaries for Work and Economy, as well as decree of Army Headquarters (Chief of Army Armament and Commander of the Training Army) B 26/27 top secret document V 8 (II/1) Nr. 624/42 top secret document of 8 February 1943).

3. On the toxicology of explosion- and combustion-gases.

Flottenarzt (Fleet Surgeon) PFLESSER

Corresponding to the experience of World War I, explosion and combustion gases claimed numerous victims among the personnel of the German Navy also in this war.

Three great catastrophies caused by enemy bombs are reported:

1. A bomb hit on a cruiser which killed 60 and wounded 22;

2. a bomb hit on a battleship which killed 89 and wounded 70;

3. another bomb hit on a battleship which killed 114 and wounded about 80.

Though these three cases, in their particulars, confirm many known facts, they also raise a new problem: in cases 1 and 2, many killed men, who had no outward injuries whatever, showed a violent cyanosis or discoloring by carbon monoxide and always a white or slightly bloody clump of foam - of about the size of a fist - at their mouths and noses. As far as autopsies were made (only in case 1), the lungs showed an intense diffuse edema, somewhat marked aspiration of coal and dust as far as the innermost parts of the lungs. No case of pulmonary edema was observed

among the surviving persons, after superficial burning or scorching, in many cases corrosive crusts of the pharyngeal mucous membrane, distinct susceptibility to infection of the respiratory organs, bronchopneumonias and bronchitis even 1 to 3 days after the injury.

It was demonstrated that neither the explosion gases nor the "impact of air pressure" offer an explanation of these findings in dead and surviving men. Rather it is highly probable that these are typical consequences of injuries to the respiratory tracts and lungs caused by heat, which were never observed in this distinct form before. The statements of the surviving men seem to confirm this theory: an intolerable sensation of heat in the lungs with the first breath in the darting flame, continued hot pain in the chest, and the feeling that the chest had become too narrow. Another confirmation of the theory is seen in the following facts: warned by experience, the part of the crew held in readiness below deck were ordered to put on their gas masks in the future in case of alerts. Reason: Protection against heat. Result: In compliance with this order, the clinical pictures observed in cases 1 and 2 were no longer observed in case 3, neither with the dead nor the wounded. Another confirmation of the theory is FISCHER's observation during an explosion accident at a Frankfurt ammunition factory in February 1917. (FISCHER and GOLDSCHMIDT: "On changes of the respiratory tracts after poisoning by war gas and after combustion". Frankfurt Journal for Pathology, Vol. 23, Nr. 1)

In case 3, there are also reported 4 men injured by nitrose with acute toxic pulmonary edemas, all of them with complications (they all had violent leukocytosis with another peak on the seventh day, 2 had bronchopneumonia, 2 collapse, 1 neuritis). Besides, their need of oxygen amounting to 156 300 liters within 4 days in spite of most economical dosage was rather surprising.

Discussion:

HEUBNER: Perhaps, the distinct boundary between pulmonary edema and bronchopneumonia is explained by the boundary between bronchiolus and alveolus, which in one case of sufficiently hot air is not reached, in the other exceeded.

EICHLER: Heat need not be ascertainable by measuring instruments. Single molecules may retain enormous energies and thus hit the alveoli (theory of hitting molecules?)

FLURY: The question, to what extent carbon monoxide travels on a street after an air-raid, depends on quantity, time, temperature, local conditions, and wind. Under pressure, carbon monoxide will easily penetrate into the porous earth while it will diffuse from it only very slowly. (During the first World War, deaths occurred in trenches and dug-outs in the porous chalk of the Champagne).

4. Concerning the question of the use of potent drugs in the Armed Forces without control by the surgeon.

1st lecture.

Oberstarzt (Colonel, MC.) Prof. W. WIRTH

This question represents a practical problem.

The need of having strong anodynes available with units left to their own resources doubtless exists, and that both from the point of view of the individual soldier and from the point of view of the commanding officer who must see to it that the morale of the wounded combatants who are not as yet wounded should not be impaired by too loud manifestations of pain by the wounded. This applies especially to the men of the armored cars. Here it is chiefly a question of alleviating pain after injuries caused by burning, which has obtained additional importance by the frequent use of phosphorus incendiary ammunition. Of course, alleviation of pain due to wounds is equally important, though great loss of blood and shock will often render such medicines unnecessary at first. Lastly, we are interested in the question raised also with regard to a possible use of war gases rapidly causing pain, such as the nettle substance phosgenoxim. In this case, not only isolated units, but every individual soldier ought to be equipped with an anodyne.

As regards the practical answering of these questions, the Anglo-Saxons have already led the way. Even in 1941/42, we found syrettes of morphium in English armored cars captured in Africa. Similar to the tubeunic-ampoules known in Germany, which are filled with lobelin by the firms Hoffmann la Roche and C.H. Boehringer, Niederingelheim. These syrettes consist of tin, with the hypodermic needle attached to them. A sterile injection is possible. Similar syringes of American origin were captured on American soldiers in Tunisia.

Contents:

English:	American:
½ grain (0.0324 grams) "omnopon" (total opium-alkaloids) with ¼ grain (0.0162 grams) morphine	½ grain (0.0324 grams) morphine tartrate

In the German Navy, there is among other medicines also morphine for alleviating pain at the disposal of the commander of submarines and other small units without a surgeon. The same applies, in particular cases, to the German Airforce as regards the equipment of airplanes. For this reason, we asked the medical authorities of the Navy and the Airforce to state their opinions on the problem in question especially as regards practical experience.

The following questions are therefore to be discussed and answered:

1. Is the equipment of units without surgeons, and left to their own resources, with strong medicines, chiefly morphine compounds for use of medical personnel a. necessary, b. suitable?

2. Is the equipment of every soldier with strong medicines for alleviating pain and preserving efficiency in case of phosgenoxim-effect a. necessary, b. suitable?

3. Should questions 1 and 2 be answered in the affirmative, the morphine syringe or preparations administered perorally should be considered particularly.

Discussion:

EICHLER: For alleviating violent pain, subcutaneous injections are necessary. The few ampoules would have to be kept under control.

SCHMIDT: Points out the danger of uncontrolled peroral doses of opium by the medical corpsman in case of obscure pain in the abdomen.

SOEHRING: To prevent misuse and unnecessary use of tabloid opiates, it is suggested to use ampoules exclusively for equipment of military units.

BOOK: In the Airforce, the equipment of all small units engaged far from a field surgeon, with morphine ampoules kept under control has proved very efficient.

ORZECHOWSKI: Refers to Navy Manual Nr. 269, page 75, par. 18.

2nd lecture:

Stabsarzt (Captain, MC.) Prof. ANTHONY

Summary:

1. To prevent fatal weariness, pervitin is contained in the emergency outfits of the flying personnel and has proved beneficial in some cases.

2. For refreshment during engagements, accessory foodstuffs containing caffein are sufficient and are generally more suitable than pervitin. Only in exceptional cases, the surgeon should be authorized to distribute pervitin for these purposes.

3. Strong anodynes were repeatedly asked for, but not yet added to the emergency-outfits. For these purposes, antineuralgic tablets were distributed so far.

4. The demand of appropriate suicidal medicines to be used in case of captivity was not complied with.

5. It is necessary to settle this question uniformly and on special lines.

3rd lecture:

Marine-Stabsarzt (Lieut., MC., Navy) Prof. ORZECHOWSKI

Peacetime medical equipment with strong medicines for smaller units of the Navy without medical officers was discussed, and the additional potent drugs in war selected for vessels sailing alone were mentioned. No objections had been raised to the equipment of naval units without medical officers with potent drugs. The long experience in this field admits the conclusion that the equipment of smaller naval units without medical officers with potent drugs is suitable.

The regulations for the Navy determing the use of potent drugs by non-medical men were mentioned. The treatment of sick sailors by laymen by aid of the book of medical advice for submarines was illustrated by a few examples from that book.

The new institution of medical N.C.O.'s with special training was discussed. These medical corpsmen may use many strong medicines from the medical outfit of the units. Experience of one year shows that all N.C.O.'s so engaged have accomplished their task most satisfactorily so far.

Directions on the questions of using potent drugs in units without control by a surgeon.

1. The equipment of the units left to their own resources without medical officers (at advanced bases, defence posts, smaller naval units) and the equipment of armored cars and planes with strong medicines (anodynes) for use in case of woundings and burning-injuries, is necessary and suitable.

2. For the purpose mentioned, particularly subcutaneous injection of morphine compounds or SEE-mixture or adequate efficacious analgetics should be taken into consideration. Importance should be attached to the preservation of consciousness.

3. If possible, the administration of anodynes should be reserved to medical corpsmen especially trained for it.

4. The application of the mentioned strong medicines by medical corpsmen for alleviating obscure pain in the abdomed should be prohibited.

X.

PROCEEDINGS OF THE CONSULTANTS' COMMITTEE ON PHARMACY AND FOOD CHEMISTRY

Translation prepared by:

Office of Military Government for Germany (U. S.)
Office of Naval Advisor
Medical Section

(SURVEY)

The Consultants' Committee on Pharmacy and Food Chemistry was concerned with the problems of medical equipment, chemical items of field equipment, usefulness of existing materials and possibilities for improvement. These topics were dealt with in various discussions by specialists who had gained practical experience in daily contact with the respective equipment, in such assignments as army pharmacists, corps pharmacists, chiefs of chemical laboratories, etc. Several contributions were made on important problems of food and nutrition. One of the outstanding speakers on this topic was Oberfeldarzt (Lt. Col., MC.) Prof. Dr. LANG, who is a member of this specialty board, which has coordinated its efforts with those of the internists, hygienists and army physiologists. In the field of analytical chemistry discussions were devoted to the influence of chemical warfare agents on food, their detection and removal or preventive measures. A further discussion of special interest in war time was concerned with technical chemical procedures for forensic medicine. Another discussion was devoted to the planned rebuilding of the various domestic industries in the Eastern territorries and to the most important cultivation and collection of wild growing medicinal herbs. (Utilization of glands).

The different reports and discussions are summarized as follows:

1. Medical equipment.

Oberfeldapotheker (Lt. Col., Pharm. Corps) Dr. FISCHER

A couple of recently introduced items pertaining to the medical field equipment now in use were under discussion and proposals as to their improvement were made after due consideration of experience made in field units. Among others, the following observations were presented. The surgical bag of the medical officers is considered too heavy and clumsy, a flat canvas bag with carrying straps and convenient compartments was proposed. The medical field equipment was likewise considered too clumsy, especially in mobile warfare. A great part of the equipment was usually left behind with the baggage. Efforts should be made to reduce set "A" to 2-3 boxes by stowing part of the dressing material in medical field packs.

It was suggested that the system of winding the instruments in a strip of canvas be replaced by using a plain canvas bag and the water barrel be replaced by a sheet metal can similar to gasoline cans.

It was considered desirable to include the following instruments in set "A": Blood pressure apparatus, otoscope and perhaps an adjustable light source working on 12 Volts, 15 - 30 Watts, with a light tripod and reflector. The following medicaments should be eliminated or reduced in quantity: Barbital, morphine, hexamethylenetetramine, digipuratum, heat stroke and calomel tablets, solvochine, and caffeine-sodium-salicylate ampoules. Consideration should also be given to replacing the opium tablets in the medical bag by tannalbin tablets. The introduction of the following medicaments was recommended: Phanodorm, luminal, eleudron and serum preparations with higher contents of antitoxics.

It was recommended that the dressing material in the medical units no longer be packed in heavy metal protected wooden cases, but in water tight bags similar to laundry bags or in plywood crates, wicker baskets or the like. It was required to provide a special compartment in these sets for the opiates that can be locked by special key. The ordinary lock now in use cannot be considered as sufficient protection. It is suggested that sets "C" and "D" be provided with a larger number of basic medicaments and be made more complete by adding the following instruments: A press for suppositories, larger mortars and perhaps even a device for the making of pills. The demand for a field distilling apparatus for the medical companies and field hospitals can be satisfied soon. A field distilling apparatus with a capacity of 5 liters will be the first model introduced. The proposed introduction of a couple of new medicaments into sets "C" and "D" is still under discussion. Requests for a greater stock of blood substitutes available in the blood-banks are constantly made. A decrease of the quantity of chloroform (for anaesthesia) in favor of ether would meet actual requirements. An exchange in the quantities of various pills would also be advisable; the quantity of calomel tablets for instance is abundant, while there are relatively too few cardizol tablets. Analgeticae and antineuralgicae and targesin throat tablets are completely absent. The stock of cellulose and cotton at the medical companies should be much greater. The proposed minimum stock of plaster bandages is in no relation to the actual requirements an increase of the stock is imperative. A larger cast knife with a wooden handle and a somewhat stronger pair of cutters for cutting the plaster casts and an adjustable pelvic shelf for the table would be desirable. The sterilization drums of the field autoclaves are not considered sufficient in number, at least 8 - 10 drums are required. Set "D" of the equipment is not considered suitable for use in field hospitals, because too many tablets, liquids and instruments of common use are missing. The development of a special set for field hospitals, subdivided into sets for the surgeon, for the internist and for the pharmacy would be desirable.

The entire equipment of the medical field depots of the Army should be overhauled and adapted to the actual requirements. It should be borne in mind, that the stock-

piling of too large quantities is detrimental to the mobility of the field depots. Special care should be given to the central-depots which, according to their important role of supplying several field depots, must be enlarged both in supplies and in personnel.

2. Chemical items of field medical equipment.

Oberstabsapotheker (Major, Pharm. Corps) Dr. MOUCKA

In the anti-gas field laboratories the following new procedures are worthwhile mentioning: More importance is now attached to the examination of aqueous sample extracts, chemical proof of Lewisite, the proof of nitrogenous and sulfurous compounds in Lost, proof of anthracene oil, and the new instructions for cleaning and decontaminating the testing instruments. In the testing instruments for chemical weapons the former DS instrument has been replaced by a gas indicator. The principal examinations will in the future consist of the following steps: The examination of the aqueous extract on chemical agents, proof of sulfur if Lost is suspected, a simple but strictly a chemical method of Lewisite detection and the proof of arsenic compounds. The new examination equipment consists of two cases: 1 case contains instruments and reagents for the chief examinations, case 2 contains the gas indicator, a device for the drawing of samples and other requisites required for urgent examinations in the field. If it is not possible to bring case 2 to where it is needed, the gas indicator and test tubes and the other necessary implements may be carried in a field pack.

The supplemented biochemical testing set permits, without changing the working methods, the following additional special examinations: Colorimetric determination of total protein, of serum albumin, of globulin in the blood, urine, and in urine the following tests: Colorimetric determination of indican and xanthoprotein, determination of diastase and the diazo reaction. The following additional blood examinations may be carried through: Colorimetric determination of cholesterine, hemoglobin, creatine and creatinine, uric acid, diastase, Takata-Ara test, determination of sodium chloride and diastase in the stool. It is planned in a later more complete model to add all the important instruments for a more comprehensive examination of blood and cerebro-spinal fluid.

The new cases Nr. 8 a, b and c of the chemical field laboratory contain instruments and reagents for the examination of water, medicaments and foodstuffs as well as for chemotechnical and toxicological examinations. Fuels can also be examined as well as metal plating and cloth fibers. The chemical field laboratory is still in the process of reorganization. The essential problems are the source of energy for the burners, incubators and stoves, and the light for the optical instruments. It is proposed

to provide a gasoline powered generator for this. The big incubator will be replaced by a new electric one and a small additional incubator for gas heating. An electric hot plate working on 120 Volts and lightbulbs for 120 Volts will be added. The new cases have a somewhat smaller size and permit their being used as laboratory desks with the aid of intermediate boards. The number of chemicals has been slightly decreased. The containers will be provided with more secure closures. The raw fiber determination developed by SCHARRER may also be used. A vacuum distilling apparatus, a generating vessel for sulphuretted hydrogen and other instruments will be added. The hygrometer and the "Pehavi" as well as the Westphal balance will be eliminated. Other instruments will be thoroughly modified. It is intended to decrease the number of ready made liquid reagents in favor of an increase of the quantities of concentrated acids. A silica compound will be used as an exsiccator filling. Dithizon and hydroxylamin will henceforth be used for the determination of small quantities of lead, fuchsin, and sodium for the determination of methyl alcohol; ferric sulphate for the determination of blood sugar according to the method developed by BERTRAND. The books will be replaced by more recent publications.

3. Pharmaceutical practice in the 6th Army.

Oberfeldapotheker (Lt. Col., Pharm. Corps)
Dr. PATZSCH

As an introduction, reference was made to the numerous pharmaceutic-chemical problems the 6th Army encountered and mastered in and around Stalingrad. As an example, the exceptional hardness of the water was mentioned, which lead to a critical situation in the water supply. The different phases of combat made frequent movements of the supply depots necessary. Only very limited channels of supply by air were left open after the encirclement of the main body of the army. Frequent changes of the take off bases of the planes were carried through in a minimum of time and required quick and strenuous action. These operations were carried through without abnormal losses. The free loading capacity of the planes allowed only medical supplies of 50, 150 or 200 kilograms to be taken aboard. The supplies thus available had to be assorted proportionally according to the requests received. The average loss rate was approximately 15 - 20 per cent. In spite of all these difficulties the most urgent demand could at all times be satisfied as long as the planes were able to operate. How important the requirements were, will be made clear by only one example: The number of plaster bandages needed amounted to 10 000 pieces per week. An important point is the standardization of the packing and crating material used for medical supplies to that already adopted in other lines of army supply. The replacement of medical equipment offered

particular difficulties, the more so, when scattered parts of the Army fighting outside Stalingrad were united with the Army Group HOLLIDT. In this case, too, the army surgeonsdid not ask first for set "A", but for the medical box "30" together with a few instruments or a complete case of surgical field instruments. In the ultimate retreat the transportation of the bulky material presented great difficulties, this is especially true for the paper-clothes and it is recommended that the volume of these items be reduced by pressing them into a more compact form. Qualified personnel to handle the medical equipment was not available during the retreat, so it happened that important items were taken too far back, which were later bitterly needed in the lines. When a landing within the fortress of Stalingrad was no longer practicable, we fortunately succeeded in dropping a scanty supply by parachutes even until the end. The allocation of the remaining material of the medical depot at Charcow to the Army Group B jeopardized a quick supply to the new 6th Army. Hence, there was an acute need of certain medicaments such as dextrose and medicines to be administered in cases of disturbances of the circulation. Solutions made of "Dextropur" (powdered grape sugar) which were offered as a substitute were rejected. It was then emphasized that an optical shop should be attached to the medical depots (army group depots and upwards to higher units), also an orthopedical shop would be very convenient. The experience at Stalingrad again showed that unforeseen situations may crop up at any time which require the medical service to act on the spur of the moment.

4. Work and special duties of the corps pharmacist in the East.

Stabsapotheker (Captain, Pharm. Corps) Dr. KLEIN

The cooperation of the medical corps (in the Eastern theater) in the supply over long distances proved very satisfactory; its work consisted in gathering up the total requirements of medical supply and in creating central distribution depots of the corps for the purpose of satisfying all demands of the army medical depots and thus in the end giving the army surgeon the material needed in his daily work. The versatility of the medical companies and their use as small supply units for advanced positions should be the most important goal. The new stricter regulations concerning the exchange of field stretchers and blankets, especially in case of evacuation by air or hospital trains and the provisions of frost-bite remedies for use during evacuation will be welcomed by the troops. The cooperation with the gas-warning officers has not been satisfactory as far as gas warfare chemistry and the use of the field gas laboratory is concerned. The gas-warning officers are in many instances not well informed of the necessity of a close cooperation with the corps pharmacist. The mess-halls and field bakeries are regularly inspected and spot checks are made on previous understanding with the proper officer. The task of the corps pharmacist is still so important today that one cannot possibly think of cancelling this position.

5. Reconstruction of the pharmaceutical chemistry and food chemistry industry in the East.

Oberstabsapotheker (Major, Pharm. Corps)
Dr. von TREYDEN

In the northwestern section of the Lake Ilmen district there are no factories of importance falling under the scope of this section. The neighboring land will also in peacetime have to supply the provincial towns. In planning for the future it would be wise to consider building distilleries, potato starch factories, wood distilling plants, medicinal herb gardens, fruit plantations (esp. raspberries and black currants). Special care should be devoted to the raising of sheep (production of wool fat) and bee-raising. The production of medicinals at Porchow and the collection of wild growing medicinal herbs should be encouraged. It should be noted that the army pharmacists have done their best to alleviate the keen lack of medicaments of the Russian civilian population in the year 1941/42. It was pointed out that the utilization of animal glands (esp. pancreas gland) in the rear territories is of the utmost importance.

6. Food concentrates.

Oberstabsapotheker (Major, Pharm. Corps.)
Prof. Dr. UNGERER

A report was made on the composition of emergency food concentrates. The daily ration of 300 grams contains about 1700 calories; it contains 8 - 10 per cent of protein calories and 68 per cent of fat calories. Additional food with an adequate quantity of carbohydrates in the form of bread, dried whole grain bread or biscuits is necessary, to give the diet more energy food and to reduce the too high content of fat. The preservation under normal temperature may be called good. Captured English food concentrate tablets weighing 2.5 grams each and which were said to contain all the necessary ingredients proved to be completely insufficient due to the fact that they contain only 9 calories. The food pill will always remain beyond realization.

7. Special forensic and toxicological research.

Stabsapotheker (Captain, Pharm. Corps) Dr. MAYER

A new method of separating alkaloids and other poisons, including heavy metals, in solution, from organic substances, and their quantitative determination in vomitus, organic pulp, etc. has been developed along the lines of electrodialysis in which four osmotic cells and certain electrolytes are used. The details and possibilities of this new procedure were then discussed. A report on the particularly rich experience of a chemical research station was then made, it included details on sabotage material for poisoning men and animals, for arson, explosive cartridges etc. which were used or surrendered by partisans. In the discussion reference was made of an enemy (English) pamphlet giving detailed instructions on how to feign oneself sick and unfit for duty and how to use certain chemicals and medicaments for the same purpose. The knowledge of these possibilities is very important to the chemical research stations for the purpose of determining malingering and purposely selfinflicted injuries.

8. Nutrition problems.

Oberfeldarzt (Lt. Col., MC.) Prof. Dr. Dr. LANG

The physical efficiency of a person requires an intake of protein exceeding by far the physiological minimum. Full efficiency is attained with a daily intake of 80 - 85 grams. Larger doses rather produce an increase of vital energy than of actual efficiency. Of still higher importance than the biological valence of protein substances is its importance as a supplementing substance. Milk protein for instance is able to supplement vegetable protein so as to obtain valuable nutrition. This was tried out in the feeding of persons injured by long continued deprival of food. Individuals suffering from hunger edema were given 50 to 55 grams of protein per day and soon their N-balance became positive. All experiments with artificial fats have been successful. A daily consumption of a moderate quantity gave no abnormal metabolic products whatsoever. In the winter campaigns in Russia when the supply of vitamin C dropped far below the desirable minimum, no avitaminotic or hypovitaminotic conditions were recognized. Experiments made in naval stations proved that severe cases of scurvy were all right again in a very short time after 10 milligrams of ascorbic acid had been administered. These experiments and the cases described in recent publications show that by far smaller quantities of ascorbic acid are required for the maintenance of health than was generally supposed. When dealing with nutritive values it must be borne in mind that the figures shown in the official schedule are by 10 - 15 per cent too high due to the decrease in quality of the respective food. If the greater part of the required protein is supplied in the form of vegetable protein, it must not be overlooked that the list

gives the percentage of crude protein and that the effective part of pure protein is only about 50 per cent or less of this figure. Bread made of finely ground flour is not as rich in protein as white bread. The contents of protein are higher, indeed, but due to the lowered resorption the actual intake of protein is lower than in case of bread made of less finely ground flour. The bran contains too much phytin and thus forms insoluble calcium salts which are difficult to absorb. Thus the consumption of bread made of finely ground flour reduces the intake of calcium. In the present ration of the soldiers there is a deficiency of calcium. Experiments to add calcium to the bread to overcome this deficiency are pending. During the discussion it was pointed out, that the absorption of vitamin B in the case of repeatedly ground flour is worse although the quantity available is larger than it is with white flour (which is ground fewer times).

9. Food and chemical warfare agents.

Oberfeldapotheker (Lt. Col., Pharm. Corps)
Dr. K. GEMEINHARDT

The problem of the influence of chemical weapons, their detection and prevention and possibilities of decontaminating foodstuffs without affecting their usefulness is of special importance in case of difficult supply and scarcity. The instructions laid down in the Field Manual 395/1 and 396 and in circular D 1107 were then discussed and commented upon. Whereas the influence of gageous and vaporous chemical weapons, including Lost vapors, can be eliminated and deodorized mechanically due to the high degree of moisture inherent to foodstuffs and which causes hydrolytic effects by simple exposure to the air and sun, this is not the case when field poison gas, especially arsenic compounds, are being used. The scraping off of the outer layers of contaminated foodstuffs brings about good results if done soon after the contamination. Before and after any treatment a chemical examination in a field laboratory is necessary. This examination does not take much time. It is emphasized that no adequate decontamination can be obtained by cooking, baking, smoking or salting, especially if arsenic is involved.

Special care should be devoted to proper packing and piling in boxes and barrels in protected places in order to avoid excessive damage. These measures, as well as the protective effect of the kinds of packing material were described. Arsenic plays the same role in the contamination of water. Gaseous, vaporous chemical warfare agents including Lost are soon dissipated by hydrolytic action: The non-dissolved particles of Lost can be eliminated mechanically by passing the water through a filter. Arsenic on the other hand must be eliminated by a more intricate procedure, not more than 50 γ of arsenic per liter can be

tolerated. This could up to the present be achieved only by passing the water through an organic charcoal filter (principle of the anti-gas field drinking water filter). Poisoning of subsoil water with chemical agents can be considered as impossible under normal soil conditions. The dilution in the subsoil flow and the chemical and physical absorbent action of the soil will soon decontaminate the water after flowing a short distance. An open well or water hole may, however, easily be poisoned. The chemical examination of the potable water must be carried through regularly.

The food chemistry laboratories, anti-gas stations and substations placed under the command of the army medical inspector are the only competent personnel to carry through these examinations with the proper equipment.

XI.

PROCEEDINGS OF THE CONSULTANTS' COMMITTEE ON PSYCHIATRY

Translation prepared by:

Office of Military Government for Germany (U. S.)
Office of Naval Advisor
Medical Section

1. Questions on the classification of psychoneurological cases with respect to service incurred disability.

Oberstabsarzt (Major, MC.) CHRISTUKAT

A brief historical review of the policy concerning claims after World War I introduced this discussion. In the nationalsocialist Germany new liberal regulations (sic) considering the welfare of disabled ex-service-men have been formulated which are guided by the principle: "Adequate employment instead of pension" and aiming at a reintegration of the disabled soldiers into a productive and contended life. A few specific cases of neurological diseases in which the environmental factor had not been duly considered were then discussed at length. It is imperative that the evaluation of each case be based on individual findings, and similar cases should not be followed. All disabilities, though they are of an indigenous, hereditary or psychoneurological origin, may to some extent be due to environmental factors (combat, privation etc.) and may be evaluated from a different angle.

2. Consideration of the list of deficiencies with regard to some forensic-psychiatric questions.

Oberstabsarzt (Major, MC.) Prof. WUTH

With a view to determining the degree of mental weakness the office of the army medical inspector has recommended to the army recruiting surgeons that a text be dictated to those subjects suspected of mental weakness. The question of the suitability of sterilized subjects has definitely been decided in the sense that they will be separated from the Army and considered unfit for military service. The modification of deficiency group 15 of the classification of fitness was then commented upon. It is understood that the LU category comprises diseases or equivalent pathological conditions, whereas delinquents (criminals, homosexual subjects etc.) fall under A 15, 3. There is an important difference between U 15, 3 and A 15, 3, and under no circumstances may U 15, 3 be considered a lighter degree of A 15, 3. In accordance with orders, forensic-psychiatric diagnoses will be made by qualified psychiatrists only. The paragraph 51, 2 penal code (*) is often applied with too much indiscretion and without proper examination to determine if paragraph 42, b would not suit the case. It is important in this connection to specify that military secrecy is an integral part of public security.

(*) Editor's Note: Paragraph 51, 2 of the German Penal Code concerns mental incompetence; Paragraph 330 etc. concerns reduced punishment according to particular circumstances, such as temporary insanity etc.

Drug-addicts or alcoholics will be classified in accordance with the provisions of paragraph 42, b penal code because the application of paragraph 42, c would, in case of punishment, result in loss of rank and therefore an unintended severity. According to the information received from the office of the judge advocate the psychiatrists will be considered the only qualified personnel to give judgement as to the application of paragraph 42 and 330, a.

3. Hysteria and simulation, with special consideration of psychogenic factors added to organic injuries.

Stabsarzt (Captain, MC.) Prof. PANSE

The overwhelming majority of psychogenic reactions are positively characterized by hysteria. I am using the term psychogenic because it is more comprehensive and less prone to emotional interpretation. The picture of spychogenic reactions has changed. They are less apparent, in a larva stage I might say, and are based in many cases on an organic deficiency. They are difficult to distinguish and therefore particularly dangerous. The proper active treatment of psychogenic cases is beyond the scope of many a surgeon in that he either does not recognize the nature of the disease or he recognizes it and treats it inadequately. Even insignificant additional psychogenic impairments justify therapeutic measures by the fact that often lead to such completely erroneous classifications as "fit for garrison duties" and "fit for labor duties". After treatment of 315 cases out of 500 at the army reserve hotel at Ensen by suggestion therapy including the use of high galvanic currents, I can now review the results which are as follows: 52 per cent were again fit for active service, 17 per cent fit for garrison duties in the field, this means that 2/3 were fit for use in combat; 24 per cent were classified as "fit for garrison duties at home" because of constitutional or nucleic deficiencies; 5 per cent were "fit for labor duties" or "unfit for military service"; 2 per cent were transferred to other hospitals and were suitable for labor assignments on an ambulatory outpatient basis. The personal background is in all cases a decisive factor for the assignment. Careful evaluation will help to prevent relapses, which however, cannot be fully excluded owing to the particular constitutional conditions of the respective soldiers. Ten cases of relapses have been reported, and it is possible that there are actually more than ten.

In 500 cases we had only one failure and that concerned an inveterate hysterical pension-hunter with experience gathered in World War I. These results will clearly demonstrate that successful treatment is possible in the majority of cases. Only refractory patients should be kept under isolated observation, especially if a detrimetal influene on other soldiers is likely to be exercised. Much of the success depends on the

physician-patient relationship, on an atmosphere of confidence creating a susceptibility to suggestion. It is a matter of fact that most of the psychogenic diseases are specific forms of an escape from environmental depressions. It is psychologically unwise for the patient to realize that his condition is due to the above stated influence because it would to a large extent jeopardize the therapeutic possibilities. The psychogenic patients are treated in the same manner as the organic patients and are not kept in detached rooms. Mistrust and embitterment which do anything but further the therapy are avoided this way. The borderline between hysterical reactions and malingering is often hard to define. We therefore, apart from a very few drastic cases, do not indulge in any attempts of differentiation but we treat the cases with energy. The result will be the same. It is recommended that suitable surgeons be detailed to army hospitals where this therapy is practised.

Comments upon the above report by Oberfeldarzt (Lt. Col., MC.) Prof. VILLINGER

The varieties of the described psychogeneous diseases have undergone a change so that now 90 per cent of the cases are side-affects of organic diseases or injuries in the form of fixations, hysterical reactions, such as: Pseudo-paralysis, pseudo-contractures, diffuse pains, vertigo and fear. A careful medical examination by qualified specialists and a psychiatric evaluation of the patient is necessary. In any case where the healing period exceeds the normal time the possibility of a psychogenic component should be contemplated and adequate treatment should be applied without hesitancy. In my opinion the neurologist is not consulted often enough. As a matter of fact, there are many psychogenic cases in army hospitals and in the army convalescence units which are not treated as such. The therapy must be adapted to each case in due consideration of the personal background, the symptomatology and genesis. Provable malingering is rather rare.

Out of 255 neurotics, 39 per cent were discharged from the hospital as "fit for active service", 27 per cent as "fit for garrison duties in the field" - this means that 66 per cent were again fit for use in field service. 27 per cent were classified as "fit for garrison duties at home", 5 per cent as "fit for labor duties"; only 2 per cent proved to be resistant to this therapy to such an extent that they had to be isolated.

In 3 cases disciplinary action was taken because of obvious malingering. It is important to keep the neurotics in a trustful frame of mind. The electro-shock following an adequate hypnotherapy has shown good results even in case of intentional opposition to this therapy. This

method is, therefore, prone to further development. A special labor therapy proved very efficacious in regard to discipline and the will to be productive. A weekly schedule of labor to be performed in different groups according to efficiency is recommended. Utilization in armament or other suitable factories is possible, the working hours should be gradually extended.

Directions on hysteria and malingering with special consideration of psychogenic factors added to organic injuries. (Supplement of the directions of the Army Manual 209/2, page 126).

1. The army and hospital surgeons are supposed to have full knowledge of the Army Service Manual 209 and of the Special Instructions dated August 31, 1932.

2. Special attention should be paid to psychogenic and hysterical disturbances in their incipient stage in all sections of army field hospitals. If the average time of rehabilitation is considerably exceeded in cases of paralysis, gunshot wounds affecting a nerve, contractures etc., a neurologist should be consulted with a view to establishing differential diagnoses of the organic and the psychogenic defects.

3. The soldiers afflicted with psychogenic or hysterical defects will not be evacuated beyond the neurological departments of the army field hospitals, apart from very exceptional cases and then only after hearing the chief of the neurological department or the consultant psychiatrist.

4. At home, all soldiers afflicted with hysterical defects which are curable almost without exception will under no circumstances be separated as unfit for military service, but they will be transferred to army hospitals provided for that purpose.

5. If these soldiers are relieved of their symptoms they will be classified according to their constitutional or organic deficiencies.

6. The therapy resistant cases will be isolated and transferred to special army hospitals or asylums in order to prevent detrimental psychological influence on other patients. They will in no case, however, be separated from the army as "unfit for service".

7. The inspection of these departments in army hospitals etc. is incumbent to the consultant psychiatrists who also have to consider other possibilities of treatment in other hospitals.

4. Encephalitis, myelitis, polyradiculitis, polyneuritis, poliomyelitis, inflammatory diseases of the central nervous system.

Geschwaderarzt (Colonel, MC., Airforce) Prof. PETTE

1. Virulent diseases.

Poliomyelitis occurred in a few instances as an after-effect of dysentery, infectious icterus, typhus and vaccinations. This fully conforms with the observation that poliomyelitis is often preceded by a non-specific infection. The incipient stage of the disease and its course as set forth in the reports which came to hand to not differ from what has been well known for a long time. In the meningeal form which seems to occur most frequently only the examination of the cerebro-spinal fluid will secure a reliable diagnosis. Cases of epidemic encephalitis are rare. Patients in a post-encephalitic condition were in a few cases erroneously considered as neurotics. The so-called "Russian headaches" observed in the central and southern sections of the Eastern Front, manifested by marked increase of temperature, must also be considered as a virulent disease.

2. Pan-encephalitis (typhus encephalitis, Japanese encephalitis and domestic panencephalitis) is characterized by pyramidal and extra-pyramidal symptoms, disturbances of the vegetative functions and psychic disturbances. In spite of an extensive histological analogy, the above mentioned diseases belong to different classes. (The Weil-Felix' reaction for instance reacts positively only in case of typhus.

3. The particular type of encephalomyelitis marked by progressive wasting of the marrow occurs usually in the parainfectious form. All intermediate phases from light paresis, paraesthesia, defective bladder and bowel function, involvement of the eyes, to severe cases of spastic-ataxic paralysis, transverse paralysis, hemiplegia, tetraplegia etc. occur. The etiology of these diseases remains unknown. In the first the patient has what appears to be an inconsequential illness which is non-specific in type, associated with a variable amount of fever, catarrhal infections etc. Encephalomyelitis occurred sporadically after prophylactic vaccinations and injections of serum.

4. Mononeuritis, plexus neuritis, and polyneuritis appear first in the nerve centers, basal ganglia, spinal ganglia, dorsal root ganglia without always sparing the peripheral nerves. The clinical picture follows the outlined development. It is not unusual that poliomyelitis affects the cranial nerves, which are, however, only in rare cases primarily invaded. Poliomyelitis appears in light cases as a weakness of certain muscles, diminished reflexes, increasing in degree

and distribution. A few patients have continued fever and progressive paralysis of the Landry type even to fatal termination. A marked increase in protein is usually observed in the cerebro-spinal fluid, whereas there is little or no lymphocytosis. On the whole, the prognosis in moderate cases is favorable and, good care provided, most of the cases will show, sometimes after a treatment extending over several months, marked improvement or complete recovery. This refers to cases with catarrhal, gastro-enteric infections, including dysentery, typhoid fever and suppurations in its early stage. Only in rare cases is plexusneuritis observed as an after-effect of injections of serums or prophylactic typhoid vaccination. At the same time, when a higher incidence of neuritic diseases was observed last autumn and winter, the ratio of late manifestations of diphtheritic paralysis also was on the increase.

As a result of the pathogenetic study of encephalomyelitic and neuritic processes it must be concluded that there are great natural variations in the virulence of the diseases and also variations in the susceptibility of the organism, due to congenital or acquired disposition. In conclusion it may be said that the problem of reduced individual resistance and susceptibility in its complexity should be given careful consideration.

Comments upon the above report by Oberstabsarzt (Major, MC.) Prof. EWALD

It will be necessary to consider both, the histopathological and the clinical aspect. We clinicians often observe a multiple sclerosis developing out of encephalomyelitis. A differential diagnosis between encephalomyelitis and acute multiple sclerosis cannot be established. PETTE has the merit of having rediscovered the role of neuroallergies for the evaluation of these problems. I feel, however, that I cannot share his doubt about the virulent character of the medullary wasting type of encephalomyelitis. The sudden onset of acute illness is also observed in poliomyelitis. The early infectious symptoms are much the same in encephalomyelitis and poliomyelitis. The fact that cases of communicable encephalomyelitis have not yet become known cannot be considered as a sufficient support of PETTE's hypothesis. Some antigen of presumably an infectious character must have been effective and caused the allergic reaction. I see a direct relation between the acute articular rheumatism of infectious origin and the later developed arthritis. We are accustomed today to view diseases from the point of view of the resisting body but this should not lead one to disregard the exciting causes. The problem of focal infection is of special importance with regard to pension claims. If encephalomyelitis develops as a sequel to acute catarrh and develops later into multiple sclerosis, this cannot be ascribed to a bad tooth but it must be admitted that an infection contracted in the service was the cause of the reaction. A pension claim would then be considered justified.

Directions.

Poliomyelitis:

Diagnosis: Cerebro-spinal fluid shows lymphocytosis with little increase of protein in the meningeal stage and in the early paralytic stage. The lymphocytosis drops rapidly and the protein content increases in the advanced paralytic stage. Besides the paretic form (flaccid paralysis, indicentally affecting the cranial nerves) there exists a non-paretic (meningeal) form manifested by fever, meningismus, lymphocytoses in the cerebro-spinal fluid, catarrhal and gastro-enteric infections, dysentery, typhoid fever, typhus, vaccinations and sometimes even after strenuous work or marching etc.

Therapy: Convalescent serum should be administered (20 - 40 cubic centimeters intramuscularly) if available. Sulfonamides are without effect. Evacuation only when paralysis is not ascending. (Danger of asphyxia in acute Landry's paralysis.)

Virus meningitis:

a. Primary form: Known as idiopathic aseptic meningitis, marked by an increase of temperature, meningismus, lymphocytosis of the cerebro-spinal fluid without local cerebro-spinal symptoms. A differential diagnosis of virus meningitis and the non-paretic form of poliomyelitis is impossible. The etiology is unknown and probably not uniform. The so-called "Russian headaches" spreading in certain sections of the Eastern Front with associated fever are probably of a very similar origin.

b. Secondary form: The secondary form appears as a side- or after-effect of other virulent diseases such as influenza, mumps, varicella, etc.

Prognosis: Favorable.

Therapy: Repeated lumbar punctures. Sulfonamides are without effect.

Epidemic encephalitis:

Epidemic encephalitis was observed only sporadically in this war. There is no treatment of choice. After-effects of encephalitis (Parkinsonism with or without tremor) render the patient unfit for active duty in the field.

Panencephalitis:

This category of diseases covers typhus encephalitis and domestic panencephalitis marked by pyramidal and extra-pyramidal symptoms, regulative disturbances of vegetative functions (restlessness, disturbances of the bladder and bowels, vaso-lability, fluctuating blood-pressure) and psychic disturbances. (The Weil-Felix' reaction is positive only in case of typhus.)

Medullary wasting encephalo-myelitides:

This group comprises the disseminated and diffuse encephalo-myelitides occurring as an after-effect of acute infections (catarrhal and gastro-enteric infections, influenza, measles, typhoid, varicella, etc.) and sporadically as an after-effect of prophylactic vaccinations. In accordance with the disseminated and diffuse processes the patients exhibit very different symptoms varying between light forms (paraesthesia in certain parts of the body, disturbances of the bowel and bladder function, paralysis of the ocular muscles, impaired vision as an aftermath of optic neuritis at the worst resulting in an choked disc, anomaly of reflexes) and severe cases (spastic ataxic complex of symptoms, transverse paralysis, hemiplegia, paraplegia, tetraplegia, Landry's type of paralysis) including all intermediate stages. Acute multiple sclerosis can hardly ever be differentiated in this general symptom complex. Similar to multiple sclerosis, these cases show a marked tendency to deterioration. The examination of the cerebro-spinal fluid reveals an increased content of cells and protein. Normal conditions of the spinal fluid were, however, not infrequently observed. The etiology is unknown. The therapy is non-specific. Patients need rest. Evacuation to hospitals at home is required. Patients afflicted with multiple sclerosis will as a rule be classified as unfit for military service. Pension claims must be approved if the acute onset of the disease occurs during the period of service with the Armed Forces. If multiple sclerosis existed when joining the Armed Forces the pension claim will then be considered only to the extent of the aggravation.

Mononeuritis, plexusneuritis and polyneuritis:

Anatomically speaking this category of diseases predominantly involves the nerve roots. The examination of the cerebro-spinal fluid reveals: Increase of protein, few or no lymphocytosis. Neuritic sciatica also falls under this category. Slight forms of polyneuritis manifested subjectively by weakness of certain muscles, fatigue and objectively by diminished reflexes and slight ataxia are very liable to erroneous diagnosis. In severe cases culminating in the Landry type of paralysis there is imminent danger of respiratory paralysis. Special care in case of an evacuation of the patients is therefore necessary. The etiology is often associated with focal infections, suppuration processes acute infections and especially with catarrhal infections, gastro-enteritides including dysentery. In rare cases plexusneuritis was observed as an after-effect of prophylactic vaccinations. Diphtheritic polyneuritis closely resembles all other forms of polyneuritis.

Therapy: Treatment of all important pathogenic factors (suppuration, focal infections, catarrhs). In the acute stage administration of pyramidon, and salicylate preparations, physical-medical treatment (heat, diathermy, short waves). Vitamin B and C preparations,

5. The inflammatory diseases of the nervous system.

Kriegsarzt (War Surgeon) Prof. HALLERVORDEN

During the course of the war the cases of encephalitis and polyneuritis have increased considerably. In most of the cases the well-known types of encephalitis were diagnosed. Encephalitis is characterized by independent inflammations usually caused by infectious agents (SPATZ); according to RISSL and SPIELMEYER, however, due to cellular infiltration. The serous inflammation should also be considered as a manifestation of allergic processes. Besides the histological complex, the distribution of the changes is of importance. These changes have been subdivided by SPATZ into 6 types, which are of no etiological importance. On the other hand it must be noted that other types of encephalitides have been discovered which are not included in this classification, namely: a type of polioencephalitis characterized by the formation of glial nodes (typhus) and a diffuse type of encephalitis (encephalitis lethargica). The following problems are now placed in the foreground of interest: 1. Precise definition of the special type of encephalitides characterized by wasting of the medulla. 2. Definition of parainfectious encephalitides and their relation to allergic processes. 3. Definition of polyneuritis of the type of ascending paralysis. PETTE in his new book refers to the medullary wasting type of encephalitides as including the groups of multiple sclerosés and parainfectious encephalitides, whereas SPATZ distinguishes between focal medullary encephalitis and peri-venous focal encephalitis. According to PETTE's theory both types are of an allergic origin.

In spite of some similar symptoms a conspicuous difference is observed in the distribution of the medullary wasting foci in the two groups. In multiple sleroses the wasting of the medulla is a selective process sparing the axis-cylinder. This may be due to the diffusion of a substance which dissolves the medullary sheath from one definite spot of the vessel all through the tissue regardless of structures and vascular supply. The process is characterized by large proliferation of glial elements affecting with preference the astrocytes and causing an unusually extensive glia scar, that is to say a sclerosis. The spread by diffusion is particularly demonstrated by the concentric sclerosis in that striae with pronounced destruction of medullary substance alternate concentrically with zones containing medullary substance. This phenomenon can only be explained as a rhythmic diffusion analogous to LIESEGANG's rings.

The so-called multiple sclerosis may not infrequently be diagnosed before the onset of medullary destruction if a typical focal distribution is recognizable. The process of medullary destruction is a common attribute of myelitis, neuromyelitis optica, encephalitis disseminata and diffuse sclerosis if the latter has an encephalitic character. Practical reasons speak in favor of a separate classification for these diseases, which have their clinical peculiarities from multiple sclerosis.

In case of para-infectious encephalitis the medullary destruction is not selective but only symptomatic and is caused by plasma extravasation from the vessels. The medullary destruction is limited to the outer fringes of the cells. The medullary sheaths and axis-cylinders decay. The glia proliferation consists of oligodendrocytes and Hortega cells, the astrocytes having hardly any part in it. The process leaves small scars. The decay of the medullary substance is slow and striated or spotty and must not be confused with the picture of multiple sclerosis. There are also marked clinical differences: The para-infectious encephalitides may heal with or without sequelae but will never turn into a progressive process such as multiple sclerosis.

The same picture of para-infectious encephalitides is observed as an after-effect of small-pox vaccination, measles, varicella, rubella, and influenza, that is to say of etiologically quite different diseases. The opinion of GLANZMANN (1927) that allergic conditions are associated with this disease has most generally been accepted. This concept is clinically supported by a distinct interval between the onset of the disease and the appearance of encephalitic symptoms. Anatomically speaking, there does not exist a typical picture of allergic tissue, but a series of morphologic peculiarities are demonstrable from which the presence of allergic conditions must be concluded (KLINGE). The findings in parainfectious encephalitides rather support than oppose this concept. They show the picture of a serous inflammation. The fact that similar pictures and the same anatomical findings have been observed, particularly with rabies for instance, seems to point in the same direction. Experiments on animals revealed similar results in many points but the concordance was not entirely convincing.

In para-infectious encephalitis, allergy is highly probable. Multiple sclerosis, however, cannot be evaluated, neither clinically nor anatomically, with this type of disease. Clinically the latter is a chronic progressive process characterized anatomically by a selective discontinuous medullary destruction which is not due to a serous inflammation as is the case in para-infectious encephalitis. Both these facts seem to confirm the presence of allergic reactions in multiple sclerosis, as far as we can say. The term "medullary wasting encephalitis" therefore correctly applies to multiple sclerosis but not to para-infectious encephalitis.

If the assumption is correct that the para-infectious encephalitis originates in allergic processes, similar foci may be expected to occur also in other encephalitides as allergic reactions may be a part of any kind of infection. In this case we would have to deal with allergic complications. Foci of this kind have been discovered and described in poliomyelitis by PETERS and HECHST. Not infrequently we observe such combinations with foci of acute multiple sclerosis in a variety termed "encephalitis disseminata". The typical selective medullary destruction

peculiar to multiple sclerosis is, however, not observed in other types of encephalitides. Where reports to that effect have been made, the significance of the process is not clearly established.

The situation is much clearer in the case of inflammatory polyneuritides which played an important role even in World War I and which have been on the increase ever since. Their etiology is not uniform. All attempts to find a virus have been in vain. In almost any case the disease is preceded by pathologic conditions of various kinds: gastro-enteric catarrhs, dysentery, angina, common cold etc. After an incubation period of 3 to 14 days we observe the sudden onset of the disease. Polyneuritides may also be due to the inoculation of serums and vaccines of different kinds and most generally affect the upper extremities, whereas the inflammatory polyneuritides primarily invade the lower extremities. Exceptions to both rules have been reported. Based on these observations, GRUNEWALD as early as in 1922 and nowadays PETTE and BANNWARTH assumed the presence of an allergy. My collaborator KRUCKE has (on the basis of his examinations concerning hypertrophic neuritis and neutral atrophy of the muscles) assumed a serous inflammation of the nerves in inflammatory neuritides and was able to prove it later on in one case described by BANNWARTH. I myself can confirm these findings from my own experience. Thus the GUILLAIN-BARRE's syndrome (great increase in the protein in the cerebro-spinal fluid without corresponding increase in cells) has found its explanations. BANNWARTH thought this increase to be due to a serous inflammation of the roots of the nerves. Thus inflammatory neuritides are thought of as probably originating in allergic conditions.

Not infrequently inflammatory alterations of the meningitis type (BANNWARTH) and encephalitis of the spinal cord and brain, that is to say a disease of the entire nervous system, are observed in many cases of polyneuritis. On the other hand we know from many encephalitides that the disease may spread to roots and nerves. In typhus this fact is well known (even the nervus sympathicus being affected) but also in poliomyelitis, encephalitis epidemica, rabies, encephalitis disseminata and multiple sclerosis, diseases of the nerves have often been described. PETTE mentions an ascending paralysis with revaccination, BANNWARTH in encephalitis japonica. The process of the disease has no limits in the nervous system, and for the improvement of our knowledge, it is therefore necessary to thoroughly examine ganglia and peripheral nerves not only in cases of encephalitis but also in polyneuritides of the spine and brain. An examination of the inner organs should never be forgotten. Only if a great many examination results are available for comparative studies, will we be able to gain more knowledge concerning these diseases.

6. Malarial therapy in the treatment of postdiphtheritic paralysis.

Oberfeldarzt (Lt. Col., MC.) FUCHS

Malarial therapy has been applied in the treatment of postdiphtheritic paralysis by MAYRHOFER in pursuance of the trials of POETZE in the Reserve Hospital XXa in Vienna (Muenchener Medizinische Wochenschrift 1942, page 974).

Patients suffering from very extensive and severe paralysis after having been for weeks and months in the hospital, were brought to full recovery by malarial therapy after two or three weeks with the exception of two cases out of 26. In most of the cases a marked improvement was observed from the very beginning of the treatment. In seven cases it was even possible to bring a still progressing paralysis to complete recovery.

Damages due to the therapy have not been observed. Observations of the heart functions (including electrocardiogram) made at the clinic of Prof. EPPINGER, Vienna, did not reveal any clear pathological effects although in the worst cases there was a suspicion of a myocarditic damage.

The therapy consists of a maximum of 4 or at most 5 malaria inoculations. A culture which is free of lues is to be used. For prophylactic purposes Digitalis is given simultaneously and during the fever strychnine, cardiazol, if necessary epethonine and in emergency cases adrenaline will be used.

It must be made a condition that the malarial therapy be exclusively applied by qualified medical officers with the necessary experience and knowledge of possible complications and hazards.

If applied under such circumstances the malarial therapy may properly be said to save the patient weeks and months of great inconvenience in case of postdiphtheritic polyneuritic paralysis.

Successful application of the malarial therapy in three cases seems to confirm the hope that it will henceforth be possible to cut down the rate of fatal terminations in polyneuritic paralysis.

Discussion:

GUTZEIT: The ban on malarial therapy in postdiphtheritic paralysis which was originally advocated by RODENWALDT seemed to me to be well founded at first. After the examinations of FUCHS, however, I am convinced that this therapy may prove life-saving in emergency cases as for instance in glossopharyngeal paralysis.

In consideration of the extremely long treatment of some cases of postdiphtheritic paralysis which last ½ to 1 year and longer, a short cut in the therapy will be welcomed. As a matter of fact the number of cases treated by FUCHS is not yet high enough to allow for a definite evaluation. If the average period of treatment could not be shortened in comparison to other kinds of therapy it may also be due to the small amount of practical experience with the malaria treatment. The apprehension of a damage to the circulation by malarial therapy is not justified in view of the perfect compatibility of this therapy in taboparalytic patients with serious heart and circulatory defects. Electrocardiographic examinations are indicated in every case. In the postdiphtheritic state of the paralysis a weakness of the circulatory system was rarely observed. A support of the circulation by medication of cardiazol or sympathol is common practice not offering any difficulty to the experienced physician. In case of life endangering phenomena the internist must assume the responsibility for a radical and dangerous therapy, even if the chance of success is not great. A certain risk must be taken in the interest of the patient. As a matter of course a dangerous therapy should only be used by qualified and experienced physicians. I wish to conclude, saying that I believe that the ban on malarial treatment of postdiphtheritic paralysis is no longer justified and I propose that the therapy be introduced under observation of the precautionary measures as outlined by FUCHS.

RODENWALDT: I fully realize that only questionable value is attached to the opinion of an hygienist in clinical matters. I was always of the opinion that malaria tertiana is a disease that should not be overestimated. This disease interfers less with the constitution and habits of life than an angina. The situation is entirely different if malaria tertiana and other diseases occur concomitantly. Complications and even fatal terminations were not infrequently observed in the latter case. It is a well known and common practice in tropical climates to follow up each puerperium or even injuries associated with considerable loss of blood to use a malarial treatment just to avoid these complications. - Every malarial infection, including tertiana, especially in case of several attacks, causes a considerable loss of erythrocytes. I therefore think that it is dangerous to provoke an additional infection in case of these diseases, which as is known by experience affect the heart and the circulation. It may sound exaggerated if I maintain, in view of the great quantity of remedies administered to support the circulation, that in the cases described by MAYRHOFER the patients survived not due to the malarial therapy but in spite of it. Finally I would like to ask how the clinician is able to determine whether a paralysis is <u>definitely</u> progressive or <u>definitely</u> stationary.

Directions for the treatment of postdiphtheritic paralysis by malarial therapy.

The institution of the malarial therapy may be taken into consideration in the following cases:

1. In malignant rapidly ascending paralysis and threatened spinal involvement;

2. Severe cases of paralysis lasting over several months.

The therapy will be instituted only in such hospitals which have the required facilities and personnel fully acquainted with malarial therapy and all possible complications, who are qualified to assume the responsibility for this treatment. These special requirements will practically only be met in medical schools, neurological clinics, special hospitals and special asylums.

The Institute for Tropical Medicine of the Robert Koch Institute is prepared to supply from their anopheles colony infected mosquitoes for military hospitals. Transport by courier is recommended.

7. Late sequelae of commotio and contusio cerebri.

Oberfeldarzt (Lt. Col., MC.) Prof. BOSTROEM

The conservative classification of brain injuries in commotio, contusio and compressio is maintained, although it is sometimes difficult to differentiate these types which may occur concomitantly.

Commotio: No pathologic-anatomic findings; clinically no neurological findings in simple cases.

Characteristic manifestations: Fainting spells and vomiting, gap in memory, headaches, nausea, giddiness, progressive subsidence but often vestibular - vertigo, prognosis favorable.

Contusio: Bruise of the peripheral ends of the cortices (contrecoup). Fainting spells are not necessarily associated with it but are frequently observed because of a combination with commotio, recovery is slow in these cases.

Clinically: In severe cases delirious symptoms, frequently retrograde anamnesis.

Neurologically: No symptoms beside an occasional impairment of the sense of smell, in case of bruised foci local symptoms in important cortical regions are rare. Psychic disposition to euphoria or lack of will-power. Hypersensitivity and occasionally incontinentia is observed.

Prognosis may said to be favorable in most cases. Cortical bruise foci sometimes do not cause any trouble whatsoever.

Complications generally aggravating the prognosis:

1. Viewed from the aspect of the constitution:

   a. Anomaly of the skull, tower-shaped deformations, digital impressions.

   b. Vasomotoric.

2. Age of the patient. Aged patients recover slowly from relatively simple commotio. Sequelae occur frequently.

3. Alcoholism.

4. Hypertonia and arterio-sclérosis.

Special importance must be attached to differential diagnosis. Special care is necessary to exclude the possibility of brain hemorrhage with compression. Consult the neurologist early with the view of:

a. determining possible compressio; lateral localization of hemorrhage;

b. establishing neurologic diagnosis for later reference;

c. facilitating early recognition of hysterical symptoms. Otologic examination is indicated (vertigo). Late after-effects in case of commotio without complication are not to be expected. Especially in case of vasomotorics, attention must be paid to possible: vestibularis, impairment of vision, vegetative disturbances such as excessive perspiration, insomnia, emaciation, impotentia, alcoholic intolerance etc.

The same disturbances may occur in brain contusions. In addition to the above symptoms special attention must be paid to possible impairment of the sense of smell and discrete focal symptoms.

Physically: Sometimes organic inefficiency, lack of initiative (examination with physiologic testing instruments does not exclude a possibility of a confusion with pseudodementia, the unobtrusive forms of which are often difficult to recognize).

Notice: Cortical bruise foci according to ESSER generally do not exhibit progressive processes of decomposition.

They may even be completely exempt from pathological symptoms.

Late hysterical manifestations:

As a sequel to commotio: Generally no massive symptoms.

Demonstrative attitude of the patient is the most apparent feature.

A hysterical superposition to organic defects is sometimes observed in contusio which can only be clarified by careful clinical observation.

It is improbable that hysteroid symptoms are simple sequelae to brain injuries. It must be admitted, however, that the failure to discover slight organic impairments explains the obtrusive and demonstratory attitude of certain patients who are considered as hysterics.

Comments on the above report by Stabsarzt (Captain, MC.) Dozent ZILLIG

Psycho-pathological findings in brain injured patients may be of importance if traumatic damages of the brain exist in those cases where contusion cannot be positively diagnosed somatically (neurological evaluation, X-ray examination, encephalogram, electro-encephalogram). The psycho-pathological findings will in any case be used in the evaluation of the suitability for military service. Apart from psychic symptoms emanating from the centers of the brain, all degrees of psychic disturbances may occur in brain injured patients according to the manifestations observed in a progressive disintegrative process of the brain. In accordance with the severity of the disturbances and the occurrence of psychogenic reactions as a sequel to the psychic inefficiency realized by the patient, there are complex symptoms and intricate pathological pictures. Among the psychic symptoms, disturbances in the sphere of the intellectual capacity may be evaluated in psycho-pathological examinations. Disturbances of the individual character and mental cast of the patient may be approached by continuous observations in the hospital or in the performance of work. The extent of the impairment of the intellectual capacity varies from severe mental deterioration (alogia and paralogia, KLEIST) to slight disturbances frequently exhibited only in subjective peculiarities of sensation. Besides an accurate analysis of the irregularities observed by the patient himself, it was found that tests concerning the systematic order of things and colors, in addition to the common intelligence tests, are especially suitable for the purpose. In almost all brain-injured patients a condition prevails of elevated vegetative and psychic lability and reduced resistance to strain. Abnormal psychogenic conditions in brain-injured patients may be due to a true incapability and must not be rated as hysterical reactions. Only a very elaborate diagnosis, established with all available methods will furnish the necessary elements for an adequate employment with the Armed Forces or other assignments and allow for an appropriate prophylaxis in order to avoid undesirable reactions in case of psycho-labile brain injuries.

Directions concerning the treatment of late sequelae following commotio and contusio cerebri.

1. Fresh cases of commotio and contusio with the exception of very mild cases, will as a rule be admitted to the hospital. A full report concerning the details of the accident will be furnished (stating in detail the duration of any possible unconsciousness, cloudy consciousness, vomiting, spells of cramps, bleeding from ear and mouth, pulse rate, pupillary reflexes). Supine position in evacuation. The hospital must have the facilities for a psycho-neurological examination by specialists and examinations by an aurist and oculist should be included.

2. The classification report in case the patient is discharged from the hospital as "fit for combat assignment", "fit for garrison duties in the field" will include a notice as to the duties which in the beginning could be hazardous to the soldier (for instance wearing of steel-helmets, no assignment as driver, etc.)

3. Complaints of soldiers who have had an accident affecting the skull concerning head-aches and vertigo should be given serious consideration especially in case of aged or vegetatively labile soldiers. It is a fact that the greater part of brain concussions do not leave serious aftermaths. In case of brain contusions, however, a careful evaluation is necessary. In dubious cases it will be necessary to institute a psychiatric and otological examination. A report of the general conduct of the soldier in combat is required.

4. In case of a discharge from the hospital as "fit for garrison duties at home" or "suitable for labor duties" it is necessary to specify the type of assignments which should be given preference in the opinion of the examining specialist. The date of the re-examination has to be fixed.

XII.

PROCEEDINGS OF THE CONSULTANTS' COMMITTEE ON TUBERCULOSIS

Translation prepared by:

Office of Military Government for Germany (U. S.)
Office of Naval Advisor
Medical Section

Sulfonamide treatment of gunshot wounds.
(See Section II, Article 6)

1. Treatment of pulmonary tuberculosis by occupational therapy.

Oberfeldarzt (Lt. Col., MC.) STEINMEYER

The medical treatment of tuberculosis is incomplete as regards its efficiency if it is not supplemented by occupational therapy. Therefore this treatment is to be added to every medical treatment of tuberculosis as a regular part of the plan. It has the purpose of making the patients able toagain perform their duty or their work by a slowly increasing activity whether it be at their former trade or another work. This therapy is not voluntary employment but an activity prescribed by the physician which is a duty and service for the convalescent soldier as well as for the soldiers needing regular medical care. The work has to be limited as to nature and time and has to be adapted to the ability of the patient. The therapy has to accomplish the following tasks: To compensate the disadvantageous sequelae of the rest cure, to restore discipline in the service, to accustom the patient to work, to give him back the belief in his own capacity to work, to make his resources gradually fit for the normal work of a trade, to ascertain how far the work is compatible with the tuberculous process, and to judge the degree of fitness for military service and the fitness for work upon release from the hospital. Inferiority complexes are to be dissipated with those patients who cannot be considered able to regain their fitness for service or work because of the kind and intensity of the process of tuberculosis. The patients are to be instructed about the purpose of the occupational therapy.

The therapy should begin at the point when the clinical treatment has reached its optimal result. The patients are to be classified into the following groups:

Group I : Closed tuberculosis
Group II : Potentially open tuberculosis
Group III: Open tuberculosis

The classification into the groups is performed by the chief physician. Skilled workers are to be used in their own or a related trade. The working patients are moved to the Section for Occupational Therapy; that means they are separated from the patients of the medical sections. The supply department of the Army is charged with the supply of work clothes (in summer, strong ticking). A permanent control by medical specialists is necessary as "the dose" of work is determined by the physician. Under these considerations there are no doubts that the patients with collapse therapy may be employed. The occupational therapy is a treatment by stimulation. If unfavorable reactions occur the patients are sent back to the medical

section. The products manufactured by the patients have to be marketable and they have to be paid accordingly. Since the therapy belongs to the treatment in the hospital no trade license is to be paid but only an exchange tax. The variety of possibilities to work is restricted only by the decision of a physician as to whether the work is suitable to the patients or not. Piece work is forbidden on principle.

The personality of the chief physician and his medical collaborators, and the proper selection of the military leader of the business (Sergeant Major of the unit) and of the foreman are decisive for a general success. The greater number of those who have attained their position from the group of patients under labor therapy, the greater will be the understanding for the healing influence of work and they will treat the patients in the right way. A success will be possible only if the problem is not approached with inadequate arrangements. Military discipline and order are guaranteed by house and work regulations appropriate to the work hospital which are to be signed by everybody on his reception at the hospital. Unsociable persons are to be separated, if necessary by compulsion.

Discussion:

LINDIG: Occupational therapy was always inadequate until now in two points: The procurement of work and the market outlet of the products. Both of these difficulties have been removed in Corps Area IV by the work ordered for the wounded and sick men of all hospitals including the hospitals for patients suffering from tuberculosis. The technical performance of the work is regulated by the different ordnance detachments. Various operations are moved from the ammunition factories to the reserve hospitals. The payment is determined according to the piece wages in use at the location concerned. The firms are expected to pay moreover an additional amount of 25 per cent to compensate for the lack of overhead expenses. This amount is at free disposal of the chief physician and is to be used in favor of the working patients. A technical and a commercial foreman who are taken from the patients of the hospital and who are trained in the factories, see to the supervision and control of the working patients, to the accounts with the different firms and to the payment of the earned wages. As piece work is usually concerned, which is examined thoroughly upon its delivery as to its value and usefulness, every patient is responsible for the work performed by him. The extraordinary high advantage of this solution consists in the firm organization which is free from the influence of the hospital and which makes the occupational therapy independent to a great extent from the changing point of view and temperament of the factory management. As under the present conditions we will not succeed everywhere in the immediate establishment of special hospitals for occupational therapy as demanded by the consultant, the various institutions of reserve hospitals for patients suffering from tuberculosis must be continued for the present and must be utilized as much as possible.

F. MEYER: Occupational therapy can be carried out in smaller hospitals only if simple work is chosen which will require no machinery. It is necessary to regulate the period of work according to the capacity of each patient. Change of trades and training for trades can be promoted only if greater units of occupational therapy are established.

GRASS: As far as I understand occupational therapy is chiefly applied to patients whose treatment is considered as nearly finished and who are to be prepared again for the demands of life as regards their ability to work. On the other hand it seems that occupational therapy is regarded as less important for those persons who live in asylums. For those persons, however, work is particularly necessary because they are forced to spend a very long time in hospitals often only as a protection for healthy persons. Work can give them a new concept of life and sometimes also the necessary income for the maintenance of their families.

ROLOFF: A difficult problem of occupational therapy is the question of wages. If we pay piece wages proceeding from the secret order of headquarters dated 16 February 1943 and the direction of the physician of the Corps III dated 10 April 1943 the following situation will be created for our hospital: With an average price of 0.50 mark which is paid by the firm of Daimler-Benz for the single armatures, the patient makes 400 marks per month if he should produce only 10 pieces per hour and should work 4 hours daily and 5 days per week. Since the patients stay there from 3 to 6 months at least the profit for the individual man would mount up to thousands of marks. Pretty soon, however, this would disturb considerably the traditional principles of free service in the Army. Patients whose physical condition does not allow such activities and possibilities of profit would envy their happy comrades as well as those who work in the kitchen or in the garden without any payment. As no regulation has been passed until now as regards these questions the following procedure was carried through in the Treuenbrietzen reserve hospital which has proved satisfactory and the subsequent approval of which is asked for:

1. The firm keeps the wage tax of the piece wages to be paid for the manufactured goods and pays it to the agency concerned.

2. The working patients do not get piece wages but are paid per hour in order to avoid every aspect of piece work and the injuries to health connected with it.

3. The patient receives 0.40 mark per working hour which are recorded exactly. This amount is paid to him at the end of each month by the sergeant-major or a person charged with that task.

4. The rest of the money gained by this work is shared among all patients of the hospital (in Treuenbrietzen reserve hospital) e.g. there could be distributed special gifts such as books, beer, wine, fruit to all patients on Christmas and some other occasions.

Nevertheless even with this system of payment which has met with no difficulties up to now and which is the most favorable one according to our experiences, the problem cannot be solved completely because the collected money cannot be fully utilized under the present circumstances. Thus we have hoarded up in our special account already an amount of more than 18 000 marks. The further use of this amount is still to be determined. It is necessary that the question of payment for the occupational therapy is regulated for all reserve hospitals in a uniform way.

Directions on occupational therapy with pulmonary tuberculosis.

1. Occupational therapy forms a regular part of each medical treatment of tuberculosis.

2. It is the aim of occupational therapy to make the patients able to again perform their duty or their work by a slowly increasing activity, be it their former trade or another employment. This therapy is no voluntary employment but productive work prescribed by the physician which is duty for the convalescent soldier as well as for the soldiers needing regular medical attention.

3. Occupational therapy has to accomplish the following tasks:

a. to eliminate the disadvantageous consequences of rest treatment;

b. to restore the patients' discipline in service and to accustom them to work and to give them back their belief in their own capacity to work;

c. to make the forces of the patient gradually fit for the normal work of their trade and to ascertain how far the work is compatible with the process of tuberculosis;

d. to judge the degree of fitness for military service or work attained when released from the hospital;

e. those patients who cannot be considered capable of regaining their fitness for service or work on account of the kind and intensity of their process of tuberculosis are to be influenced psychically in a favorable way.

4. It is to be aimed at that the patients destined for the occupational therapy are housed in a special section separated from the medical section.

5. The kind and duration of the work is determined by the chief physician who is also responsible for the medical control. If the patients react unfavorably to the occupational therapy they are to be sent back to the medical section.

6. The products manufactured by occupational therapy have to be marketable and have to be paid for accordingly. Each patient who has to work under the occupational therapy program is to be paid accordingly.

7. It is to be aimed at that in each military district a large unit for occupational therapy is to be established in a reserve hospital for tuberculosis where different kinds of work may be carried through with payment. Moreover, occupational therapy is to be carried out in every reserve hospital for tuberculosis for the hospital itself even without payment according to the possibilities available.

8. On account of the present situation of the total mobilization of every working power the occupational therapy in the hospitals for tuberculosis is of extraordinary importance because a great number of patients who are still fit to perform productive work have to stay there for a long time. We cannot account for leaving unused the working power which these patients still possess. In order to obtain work the hospitals contract their own armament units or proper firms.

2. Investigations of pulmonary tuberculosis and other pulmonary diseases by tomographic X-ray pictures.

Geschwaderarzt (Lt. Col., MC., Airforce)
Professor BACMEISTER

The following directions result from film findings and interpretations.

1. By dividing the usual X-ray pictures into planes or sections an insight into the conditions of organs and an exact localization of the changes caused by diseases and foreign bodies (bullets) in the lungs is possible.

2. Investigations by tomographic X-ray pictures have become of great value with pulmonary tuberculosis for:

   a. the recognition and localization of cavities,

   b. the indications for operations,

c. The tracing and the observation of the process of the disease and the success of the treatment (e.g. before giving up pneumothorax and in the follow-up of the operative treatment).

3. The tomographic X-ray investigations can be of decisive value to differential diagnosis and localization in the observation of the course and the healing of pulmonary abscesses, tumors, shrinking and deterioration processes of diseases of any kind in the chest. Especially those cases with congenital or acquired bronchiectasis and cysts of the lungs in the upper lobes without pulmonary symptoms of activity, who often undergo in vain long and repeated treatments and are considered as suffering from pulmonary tuberculosis, can be isolated more easily by the procedure of the tomographic X-ray pictures and can be separated from patients suffering from pulmonary tuberculosis who need treatment and can be judged in the right way as to their fitness for military service.

4. It is indispensable that every large hospital for patients suffering from tuberculosis has the possibility to carry through tomographic X-ray investigations (perhaps in connection with other hospitals or civilian hospitals). Those cases of pulmonary tuberculosis which are not clear as to the diagnosis are to be transferred if possible to hospitals with the appropriate facilities or possibilities. Before carrying out collapse therapy, the procurement of tomographic pulmonary pictures is always advisable in addition to those cases having a special indication.

Discussion:

F. MEYER: The essential importance of tomography lies in the diagnosis of cavities and the analysis of the processes at the apex. Tomography is necessary:

1. If differences exist between the clinical judgement and the X-ray diagnosis;

2. if extensive collapse-surgical procedures are applied;

3. if the judgement of fitness is concerned with a special responsibility of the military physician and a responsibility as regards social hygiene.

KREMER: Three sections are not sufficient but we must take a section through the lungs every 1½ centimeters at least. Probably we will be able to diminish the consumption of films in the future by the tomographic photofluoroscopy procedure recommended by JANKER.

GRASS: It seems to me that the procedure of sectional photographs is of special importance particularly if connected with group X-ray investigations. By my cooperation with the chief physician of the reserve hospital in Beelitz, Oberstabsarzt (Major, MC.) KREMER, I became acquainted, in addition to the cavities mentioned before, especially with caseated bronchi and the smallest cavities and learned to evaluate them. It seems to me that to observe their changes with repeated investigations can give valuable information about the origin of tuberculosis, principally with group investigations when we see again and again tuberculous soldiers doing their duty. The procurement of a tomographic instrument for the agency doing group X-ray investigations would make it unnecessary to transfer a great number of patients to an observation ward.

3. The organization of investigation by photofluoroscopy in the Armed Forces.

Oberstabsarzt (Major, MC.) GRASS

As it is particularly difficult to ascertain the fitness for military service of tuberculous patients it was useful to charge one physician with a greater district as far as possible, e.g. a military district (Corps Area) in order to reach uniformity of evaluation and to use the collected experience.

For such a task the physician always needs a recent X-ray picture which can be produced in such quantities only by photofluoroscopy. Processes of tuberculosis unknown till now can also be discovered with it at the same time.

Though the serial X-ray investigation gives valuable facts for the diagnosis of all diseases which show up in the X-ray picture of the chest, it has by far the greatest importance for the diagnosis and evaluation of pulmonary tuberculosis.

Therefore it is useful that the group X-ray investigation be performed under the control of a specialist for pulmonary tuberculosis because the survey about the general findings offers an important base for the evaluation of the individual case. He must also have available the means for a prompt out-patient and ward investigation of questionable diagnoses. If the leader of the group X-ray investigation is charged with determining the findings and the evaluation of the patients and if this follows immediately after the X-ray investigation the latter is more than a mere searching procedure. Even in earlier times it was a means which fitted harmoniously in the general campaign against tuberculosis when specialists for pulmonary tuberculosis used it with the aid of fluoroscopy.

Although X-ray specialists have shown that hundreds of thousands of patients could be investigated with the help of photofluoroscopy within a relatively short time it still is considered only as a searching procedure because they have been neither willing nor in the position to take over the responsibility for the evaluation of questionable findings and the care of the patients. Thus the value of the original photofluorograph was diminished. The latter was filed according to a description, often supplemented by an enlargement, together with the other picutres photographed on the same film in a way which made its repeated use nearly impossible.

If the photofluoroscopy forms a basis of judgement for the specialist for pulmonary tuberculosis it is of greater documentary value. The leader of the agency for group X-ray investigations must be able to verify all findings by means of the original photofluorograph and it must be at any time at the dispcsal of other persons interested in it, especially for comparison on the occasion of repeated X-ray investigations.

Since it is difficult to keep and to look at the individual picture when cut off from the film it is placed on a holder which shows the name of the patient so that it too may be projected on a screen. If the name is registered at the top of the card the card may be kept in the health record. If the person examined is designated only by a number this number is entered in the paybook of the person. The cards are collected in the Central Archive for Military Medicine.

For the evaluation an anamnesis must be available for all "known" tuberculous patients, which is in the form of a questionaire.

In order to decide questionable findings the possibility of fluoroscopy, of manufacture of enlargements and of blood investigations has to be available. Photofluorographs are of an average size of 6.4 x 6.4 centimeters which show very little grain and are therefore nearly as valuable as an enlargement as to their quality. They might be enlarged advantageously much more frequently, e.g. of all those who pretend to be ill. Almost more important would be the possibility to produce outpatient tomographic X-ray pictures because with the help of them active processes can be ascertained earlier. They favor a more certain and quicker evaluation and save many assigments to the observation ward.

To perform the evaluation in a uniform way the necessary clinical observations are to be carried out in <u>one</u> reserve hospital with which the photofluorographic unit works in close cooperation. In addition to the usual examination methods it must offer the possibility of carrying through tomographic X-ray examinations and the culture of the content of the empty stomach.

It cannot be ascertained with a first examination whether the foci are quiescent. Certainly the recruit should be deferred for about half a year, the youth of less than 20 years of age for one year. The soldier has to be judged as fit for garrison duty and the date of the second investigation is to be fixed. This will be done according to the kind of foci within the period of six months. At the second medical investigation the former photofluorograms are to be taken along for comparison with the new ones. A change in the X-ray picture indicates activity of the process.

The organization of the group X-ray investigation must always be adequate for the tasks in question. The number of the investigations, as well as that of the personnel and material are to be arranged at each step of the working process in such a way that each agency is fully engaged if possible and that no interruptions occur. A long interruption might disorganize the procedure within a short time. This is to be considered especially at the medical examination of the films and at the evaluation of the findings. Therefore a medical substitute must be available at any time lest a lack of physicians results in an interruption or a restriction of the group X-ray investigation.

The following requirements have to be met:

1. The examined persons have to pass as quickly as possible in order to spare the working persons. About 200 persons are to be ordered to come to the investigation per hour, only in the case of a very large number up to 300 persons.

2. Urgent cases have to be judged within a few hours, the others within some days.

3. It must be determined who will perform each working process in order to avoid mistakes.

4. With a repeat examination the former photofluorograms have to be at hand for comparison.

5. The findings and the evaluation are to be written on the reverse side of the photofluorogram card and signed by the physician who made the findings. Moreover, they are to be put down in lists with an indication of all the necessary data.

6. Persons suffering from active tuberculosis who are under the suspicion of being infectious are to be reported to the physician of their unit if possible with an enlargement of their photofluorogram.

7. The observations are to be gathered in statistics and are to be evaluated.

The experiences with repeated investigations of the same patient, the cooperation with the observation ward and the statistical evaluation of the diagnosis are the most important factors of experience for the further improvement of the achievements.

The results show the extraordinary importance of X-ray group investigations for the evaluation of persons suffering from tuberculosis as to their proper use in the Army. But they show moreover that great reservation is necessary concerning the evaluation and forwarding of findings unless numerous people with foci shall be unnecessarily made anxious. This would give them not only an unnecessary feeling of being ill but at the same time it would damage a great deal their capacity to work and their defensive power.

The X-ray group investigation is valuable too for the findings which are not of a tuberculous type. But these are of such minor importance that they can be mentioned by the specialist for tuberculosis. They are to be judged by the physician who is responsible for the medical examination or the physician of the troop.

Directions on the organization of investigation by photofluoroscopy in the Armed Forces.

The present directions are to be considered as a supplement to those put down on the occasion of the last conference of consulting physicians for tuberculosis.

In this document it was mentioned that the photofluorographic investigation is suitable, not only as a searching procedure but also as a base for the explanation of questionable diagnoses as well as for the observation of the course.

Therefore the agency for X-ray group investigations has to be headed by a specialist for pulmonary tuberculosis who should have available all means for an ambulatory and secondary investigation, (fluoroscopy, enlargements, tomographic pictures, investigation of blood) usually in connection with an observation ward.

It is indispensable that the individual photofluorogram is kept alone and not together with others on one film so that it may be available at any time for a control and comparison with new pictures.

For that purpose it is pasted in or on the file card the heading of which is photographed together with the photofluorogram for identification. The card is kept either in the medical record if identified by the name or in the Central Archive for Military Medicine if identified by a number which has been entered in the paybook.

The procedure of the entire investigation has to correspond to the task in question so that a uniform drafting is guaranteed with the least use of personnel and material and without the danger of interruption. In case of emergency an extra physician must be available who is trained for photofluorographic work but who otherwise is assigned at a different place. Moreover the personnel, as far as it remains fit for garrison duty or fit for labor, should not be moved without consultation with the chief of the X-ray agency.

The following items are also of importance:

1. In order that the persons to be examined are not unnecessarily kept away from their work, the number of the people ordered for the examination has to be small enough that no long waiting times occur.

2. Urgent cases are to be judged within hours, the others within some days.

3. It has to be evident who is to carry through each process in order to quickly remedy mistakes which may occur.

4. At each repeat investigation the earlier photofluorogram kept in the medical record has to be available for comparison.

As far as X-ray findings are not the manifestation of pulmonary tuberculosis they are to be entered with the corresponding number of the defect onto the card so that they can be considered by the medical examination physician or the physician for the troop.

4. Functional tests with patients suffering from pulmonary diseases in Armed Forces hospitals.

Stabsarzt (Captain, MC.) Professor ANTHONY

I. The functional tests shall correspond on principle to the following requirements:

1. The method of investigation shall not harm the person to be examined and shall not influence and change materially the process to be examined.

2. The physiological relations on which the investigations are based have to be known.

3. The standard values have to be assured by a large number of investigations.

4. The procedure must have the possibility of differentiation as clearly as possible.

5. The findings shall not be ambiguous if possible.

6. As many tests as possible should be made in one examination period.

Partial functional tests which relate only to one partial function lead very easily to an over-evaluation of this partial function according to experience. On principle it is more useful to apply a more complicated procedure which furnishes uniform and clear results than to apply a simpler procedure, the results of which are hard to explain. Highly approved investigation instruments are required.

II. Tests under physical strain are to be performed according to the following principles:

1. Very short physical strain is generally less suitable because the results are ambiguous. With this procedure the reaction during work is not tested but rather the reaction to the change to work and the change from work to rest.

2. One cannot conclude directly from the reaction on a certain kind of physical strain how the organism will react on more or less intensive types of physical strain.

3. The operation of cranks while standing is widely used because this work requires only a little practice and many parts of the body are used.

4. Attempts to work for 6 - 10 minutes are suitable for evaluating the respiration and circulation during the work.

However, they do not justify conclusions about the capacity to work under physical strain of a longer duration. In this case the feeling of fatigue and the processes on which it is based take an important part. These processes cannot yet be traced down by simple quantitative methods of investigation.

III. The results of the different examinations contribute to a general evaluation and it is of decisive importance to combine the different factors in this sense. The function tests are intended to complement the medical diagnosis and they require additional chores and a special qualification of the surgeon in the evaluation of these factors. These methods will therefore be introduced only in such cases in which an additional effort is justified.

IV. With patients suffering from pulmonary tuberculosis the exchange of gas at rest may be increased because it is the manifestation of the toxic general effect. There exists, however, no direct relation between the seriousness and the extent of the disease. The kind of breathing can show clear deviations in the case of severe lung defects in the form of short, more frequent and irregular breathing. The shape of the curve of breathing shows to what extent emphysematous changes exist in the lungs other than tuberculosis.

An increase of the ventilation of the lungs is very frequent with patients suffering from pulmonary tuberculosis (COBET and his collaborator PETZOLD).

The vital capacity of patients suffering from pulmonary tuberculosis may be diminished in various ways. There is no relation to the seriousness of the process of the disease but the greater the effort of the scarring in the lungs and the pleura on the maximal respiratory movements, the more the vital capacity will be diminished.

The maximal ventilation of the lungs, the so-called respiration limit is of special importance.

In most cases patients suffering from pulmonary tuberculosis consume more oxygen at work than healthy people. The consequence is an aggravation of the effect. The exchange of oxygen between the lungs and the blood can be disturbed with patients suffering from tuberculosis. This hypoxemia can be proved either by investigations of the arterial blood of the capillaries or by spirograph investigations of the oxygen deficit.

The investigation of the respiration in rest can be supplemented if necessary by spirography of the patient under physical strain. In general the ventilation of the lungs will be utilized to its limit at work only if the respiratory margin is essentially diminished. With healthy and slightly sick people the efficiency of the heart is decisive for the limitation of work in most cases.

V. The EKG at rest and after physical strain offers a good basis for the evaluation of the heart. GAUBATZ has recently carried through investigations of prolonged physical strain and has performed the investigation method of SCHELLONG immediately after ergometer investigations.

It has already been pointed out that for a large number of the heart function tests a short physical strain is sufficient. With this the blood pressure and the frequency of the pulse are determined. Various investigators who applied these methods stressed the fact that with an inefficient cardiac function the pulse rate increases relatively more than the amplitude of the blood pressure. I have the impression that these short tests of functions of the heart of the type used until now are not yet satisfactory on principle. They inform us about the kind of circulatory regulation during work but do not give any information about the efficiency of the heart. It would be better to eliminate completely these short tests and to use instead a longer period of physical strain.

A rather good measure for the judgement of the efficiency of the heart is the maximal intake of oxygen found during a slowly increasing physical strain.

VI. The question must now be answered, in which cases those methods shall be applied which require a special expense. Without doubt it is desirable to use these procedures systematically with a great number of patients because they always enlarge the diagnostic background and enable us to evaluate these methods better. On the other hand it is evident that these methods are not absolutely required in order to gain a reliable opinion about the disease of tuberculosis and its effect on most of the patients. The experienced physician has numerous other means at his disposal which give him a true picture of the seriousness of the effect of the disease. Every specialist knows of patients where an opinion concerning the capacity to stand physical strain is difficult for various reasons (capacity to stand surgical approaches and capacity to work). In Armed Forces hospitals it is to be considered that with one part of the patients subjective complaints are overevaluated and with the other part underevaluated in order to attain special objectives. In such cases the use of the above mentioned investigation methods should be required so that the medical evaluation may be accurate in every respect. The use of these procedures is therefore necessary only with a relatively small number of patients.

VII. In order to perform these methods, central, separate units are more suitable, since the nature of the methods and the evaluation of the findings always requires special knowledge. Therefore I think it profitable to designate some tuberculosis hospitals of the Armed Forces for such investigations and to assure that a really detailed investigation of the patients is performed there and that the findings are judged by specialists. Further it is required that the functional tests of the respiration and circulation of patients suffering from pulmonary tuberculosis in hospitals of the Armed Forces are to be performed in such cases in a uniform manner.

Directions on functional tests.

1. With patients suffering from pulmonary tuberculosis thorough functional tests of the respiration and circulation are necessary in order to judge the capacity for standing physical strain in borderline cases and doubtful cases as well as before major surgery on the lungs with serious and relative indications. The use of such methods is desirable also with other patients suffering from pulmonary tuberculosis in order to be able to judge more thoroughly the effect of the disease and of the surgical stress on the respiration and circulation.

2. I propose the following investigations be made:

a. The volume of the lungs (if necessary the residual air),

b. the respiratory margin by arbitrary deliberate overventilation,

c. ventilation of the lungs and exchange of gas at rest and under physical strain (with the calculation of the oxygen deficit),

d. the frequency of the pulse and of the blood pressure, reclining and standing,

e. the blood pressure, the frequency of the pulse and the EKG at rest and after physical strain.

3. The use of these methods presupposes special investigation apparatus (a spirograph, an ergometer, an EKG, a sphygmomanometer), trained auxiliary personnel and physicians who are experienced in the judgement of the findings. Therefore I propose to contact those hospitals of the Armed Forces which already have available such apparatus and to assign them the task of performing these investigations.

5. Gymnastics for patients suffering from tuberculosis.

Oberstabsarzt (Major, MC.) Prof. ULRICI

Since DETTWEILER the essential part of the open air treatment of tuberculosis takes the form of the rest cure while the type originally introduced by BREHMER consisted only in walking and sitting outside. With this measure the rest cure entered the hospitals for patients suffering from tuberculosis and the principle of rest has been overemphasized. There is no doubt that patients with symptoms of very active processes of tuberculosis must take care of their bodies. If they have fever they even have to stay strictly in bed in some hospitals for many months. Such a rest therapy often achieves a calming down of the process of tuberculosis which is manifested in the normal temperature of the body, in the values of the sedimentation rate and basal metabolism, in the shift of the white cell picture of the blood to the right, in the change of the symptoms, especially of the cough, of the quantities of sputum and of the night sweats. It must, however, not be overlooked that with complete body rest a debility of the muscles of the body is involved and a depression of the automatic functions of the inner organs, especially of the circulation and the gastro-intestinal functions, and that the patient urgently needs the full function of his organs after his reconvalescence for a normal life and for his trade, for maternity and joy of life. Moreover, every healing of a tuberculous process is a healing with defects, defects which can be measured beyond question in the case of pulmonary tuberculosis by using the functional test of the lungs with the KNIPPING apparatus. The lungs contribute to the exchange of gas and thus to an important part of the metabolism but the achievement of the organ is nearly an exclusively passive one and the necessary compensatory work has to be taken over partly by the respiratory muscles

(intercostal muscles, auxiliary muscles and above all the diaphragm), partly by the circulation. A permanent healing of pulmonary tuberculosis and the capacity of performing permanent achievements of the reconvalescent therefore depend on the capacity of the circulation. Moreover, the stomach and the intestines function much better if the organism can work by exercises of the body. Since it is not quite wrong to call tuberculosis a disease of domestication, it is evident that such a disease can be healed only by exercises of the body in the open air.

Therefore it is necessary to eliminate the principle of rest therapy even during the treatment in the hospital as soon as the patient's state of health will allow it and to restore the achievements of the body through progressive exercises. In the hospital, one tries to meet this requirement by gradually allowing the patients some activity but they are predominantly confined to walks, if possible in the so-called "cure-step". If the hospitals are situated in the mountains, certain physical strain is associated with these walks, that means an exercise of the respiration and circulation. The walks on the level, however, can hardly claim to be a physical strain because of the short time permitted. A strengthening of the muscles without considering that only the muscles of the legs are concerned and those of the heart can hardly be expected with such exercises of the body. Therefore we receive complaints again and again that especially the manual workers leave the hospitals with a proper weight but quite insufficiently conditioned for their trade. These experiences resulted in the idea of including occupational therapy in the healing procedure and thus has already been discussed for a long time today. The use of gymnastics, which only occasionally has been introduced, in the convalescent treatment of tuberculosis and as a rule only for special purposes, namely after the performance of major operations, proceeds from the same experience. According to my experience of many years I think the problem of gymnastics is important and effective enough to make it the subject of a separate lecture.

By gymnastics we mean the daily morning calesthenics and special exercises. The morning calesthenics, however, may be compared by no means with the training which students or soldiers have to undergo. In all cases easy athletic exercises without strenuous runs are carried through. The patients are divided into groups. If they are selected for the morning calesthenics by the ward physician they are assigned without exception to group I, which begins with easy exercises of ten minutes' duration. They move up to group II according to their pulmonary reactions and their status of disease and they have to perform some more difficult exercises during the second ten minutes of the morning calesthenics in order to move up eventually to group III, if the pulmonary reaction as well as the general state of health permits it, in order to do some more difficult exercises during the last ten minutes. It happens of course very often that patients stay in group I or II.

Patients with pneumothorax e.g. can stay only in group I or II since intensive movements of the trunk and jarring have to be avoided. The morning calesthenics are carried through in the open air even in winter in light clothing as we associate with it a gradual, mild but very effective hardening. As to the special exercises we formed again three groups:

I for patients after large operations (plastics)
II for patients with bone and joint tuberculosis
III for children.

We selected and put down the light athletic exercises for all groups with the help of a sports officer and a physician trained in sport, moreover we have employed a teacher of gymnastics for years under whose supervision and example all gymnastic exercises are carried through.

I admit that I met again and again with doubts among my collaborators as to the use of gymnastics with the patients suffering from tuberculosis. I am sure that one or the other would have liked to demonstrate the disadvantages of such gymnastics but I cannot remember of having seen in any single case a disadvantage caused by the participation in gymnastics. The patients become well accustomed to go out of their ward beds into the cold in winter in their shirts and gaiety and good humor always prevails with these exercises. Occasionally our teacher for gymnastics interrupted the life in the hospitals in a nice way by performances of dances and gymnastics. On the whole we are extremely satisfied with the gymnastics and would not like to eliminate them from our convalescent treatment.

(Demonstration).

Directions on gymnastics for patients suffering from tuberculosis.

1. Generally the patients suffering from pulmonary tuberculosis leave the convalescent hospital or the tuberculosis hospital insufficiently prepared for the final conquest of tuberculosis as well as for future life and trade. In addition to occupational therapy (especially with intellectual persons) gymnastics are useful to give the patient a better preparation.

2. After the clinical symptoms of the disease have subsided all patients should take part in gymnastics which are graduated according to the patients' capacity.

3. It has proved satisfactory to perform the gymnastics in 3 groups.

I easy exercises 10 minutes,
II not too difficult exercises an additional 10 minutes,
III more difficult exercises a further 10 minutes.

It will often happen of course that patients have to stay in group I or II due to their state of health and their capacity (e.g. patients with pneumothorax). The exercises are to be chosen carefully by physicians experienced in sport for the intended purposes and are to be conducted by personnel trained in gymnastics.

4. Special exercises serve to regain a restricted use of the limbs.

I after large operations (plastics),
II with extrapulmonary tuberculosis (bones and joints).

6. Minor surgery with pulmonary tuberculosis in Armed Forces hospitals.

Oberstabsarzt (Major, MC.) RICKMANN

Directions:

1. The pneumothorax is a procedure of treatment with tuberculosis which is applied with present or threatening deterioration. Its use in time is a presupposition for its success. The incomplete pneumothorax is to be supplemented in due time by thoracocautery or paralysis of the diaphragm.

2. If the pneumothorax is ineffective the matter should be re-evaluated as soon as possible in consideration of another surgical approach.

3. Each pneumothorax treatment requires constant control by X-rays.

4. In order to make out-patient pneumothorax treatment more easy and more certain a list is to be established in every military district of the appropriate possibilities to have the pneumothorax refilled (military hospitals, hospital, physicians). These possibilities of obtaining a refill should be made available to all soldiers and patients on their release from the hospital in order to save the patient strenuous and injurious trips.

5. Patients with pneumothorax should change their hospital as seldom as possible in order to remain under the treatment and supervision of the same physician.

6. After-controls of the out-patient pneumothorax treatments have to be performed in the nearest military hospital every six months.

7. As to the artificial paralysis of the diaphragm, the temporary elimination of the phrenic nerve by crushing is to be preferred in most cases. The paralysis of the diaphragm should be performed, in general, only with processes of the lower lobes.

8. The suction drainage of the cavities cannot replace the proved collapse therapy measures but may supplement them in proper cases. As a single measure it is generally used only with quite isolated large cavities.

7. Major surgery with pulmonary tuberculosis.

Oberarzt (1st Lieut., MC.) Dozent ADELBERGER

Together with Directions:

1. With the patients of the Armed Forces suffering from tuberculosis all necessary methods of treatment including major surgery are to be used.

2. The basis of major surgery of the thorax is a good general defensive condition of the body which has to be assured by preceding and subsequent therapy in spas with general and climatic treatment.

3. Major surgical procedures for collapsing the lungs are to be undertaken only after the results of pneumothorax treatments indicate that further efforts along that line are in vain.

4. The following methods are generally approved: Thoracoplasty and collapse of the upper lobe. Recently extrapleural pneumolysis with subsequent air injection or later oil injection has been gaining more and more followers.

5. By the last mentioned operation the breadth of indication for surgical approaches has been enlarged a great deal because even cavernous processes in earlier states of development can be operated successfully.

6. Thoracoplasty still covers large, rigid tertiary cavities in so far as the respiration and circulation, as well as the state of the other lung, control the indications. Total plastic operations occur relatively seldom with soldiers and only in the case of diseases of one lung or pleural empyema. In most cases the upper partial plastic will be used with a total resection of the first, second and third ribs and if necessary with extensive apicolysis. In order to not burden the patient too much the surgical approach should be subdivided in two different stages. An apex plastic is to be used only in the rare cases of rigid isolated apex cavities which are firmly fixed at the top of the thorax.

7. A primary collapse of the upper lobes is maintained in the cases of large tertiary cavities if satisfactory conditions for thoracoplasty, on the part of the circulation and the functions of the lungs, are not present.

8. The extrapleural pneumolysis includes first of all the cavernous processes of earlier stages of development as well as those of less extent. Nevertheless the possibility of revising the collapse shall be preserved.

9. A supervision, and if required a revision, of the collapse has to be carried through every six month with outpatients at a hospital for tuberculous patients.

10. Major surgery with tuberculosis of the lungs is to be confined to certain special hospitals which dispose of all the necessary equipment and personnel. A survey about suitable hospitals should be handed to the reserve hospitals, the hospitals connected with them, and to the military welfare organizations.

8. Experience with the diagnosis and the treatment of extra-pulmonary tuberculosis in hospitals of the Armed Forces.

Oberstabsarzt (Major, MC.) KREMER

Directions:

1. The early diagnosis of tuberculosis of the bones and joints is usually a clinical one. The X-ray picture is taken too late. The diagnosis is assured, if possible, by exploratory punctures and exploratory excisions. Tuberculin tests which produce focus reactions are not to be used on account of the reaction of the lungs which usually occurs at the same time. Fistula contrast fillings are often indispensable.

2. The basic treatment of tuberculosis of the joints and bones is the open air treatment by heliotherapy (caution with active pulmonary tuberculosis). Climates which cause strong stimulation promise the greatest method.

3. The climatic treatment has to be combined with orthopedic and surgical treatment. The circular plaster cast is superior to the traction method.

4. Surgical approaches are to be applied:

   a. if the period of treatment can be shortened essentially without much harm;

   b. because of vital indications.

5. Tuberculous abscesses are to be aspirated with syringes with a large needle (not record syringes) and if necessary by stab incision but they are not to be opened widely.

6. Patients with tuberculosis of the spinal column and tuberculosis of the joints of the lower extremities are unfit for service, while with the upper extremities each single case has to be decided individually.

7. With tuberculosis of the glands, X-ray treatment associated with sun and open air treatment is the method of choice. Isolated glands can be extirpated. In most cases unfitness for service is the result.

8. In the case of genital tuberculosis a mere conservative treatment is justified only with small nodules in the epididymis. Otherwise operation with subsequent open air treatment is required. Those patients with the unilateral non-fistulating type may be fit for service. Patients with the bilateral, non-fistulating type are unfit for service.

9. With unilateral tuberculosis of the kidney early extirpation with subsequent heliotherapy is required.

10. The variety of the methods of treatment requires the establishment of special hospitals or departments with appropriate equipment and properly trained personnel.

Supplementary remarks to the report of the Second Conference of the East.

Concerning the tactical use of small hospital ships.

Marine-Stabsarzt (Lieut., MC., Navy) KUTSCHER

In World War I the big hospital ships, the structure of which had been changed in 1914, were put out of commission after a short time because of the kind of naval warfare and the lack of theaters with oversea bases. The number of smaller vessels, however, was augmented. The main task of the latter consisted in the transportation of patients and wounded near their home shore or from an advanced base to the homeland. The medical treatment was secondary in this case. Thus the transportation of the victims of mine warfare, the transportation of those wounded by accidents as well as of the victims of naval warfare and torpedo-attacks had to be dealt with. In case of landing operations, wounded and sick had to stay on board for a long time. That means they had to be treated on board until transportation to the far distant hospitals in the homeland was justified by the numbers. Inadequacies occurred because the possibilities of treatment on board were insufficient. Increased demands were made on the smaller hospital ships in a short time which surpasses the purpose for which they were intended. The demand on small hospital ships should not surpass what is expected of the fleet train within protected waters. For the treatment and for mass transportations, especially across the open sea, large hospital ships are necessary.

This war has given new aspects to the tactics of using hospital ships for medical purposes because of the new conditions of sea strategy and the new numerical proportions of the naval forces.

The report deals with the experiences gained during a period of more than two years concerning the use of a small hospital ship while the ship was used predominantly in the area of the Polar coast.

A modern investigation ship originally destined for the Arctic Ocean with a great radius of action and good speed had been rebuilt. It had 100 beds (60 regular and 40 reserve beds) moreover the necessary additional rooms, such as operating room, the dental clinic, etc. Besides the chief physician, who was responsible for the performance of the military tasks, a surgeon, a dental officer, medical personnel, naval engineers, signal and radio operators, and administrative personnel of the Navy were on board and in addition the crew of the merchant marine which was necessary for operating the ship.

The ship had to meet the following requirements:

1. Readiness within a certain coastal sector,

2. Medical care of coastal defense forces,

3. Tasks of transportation.

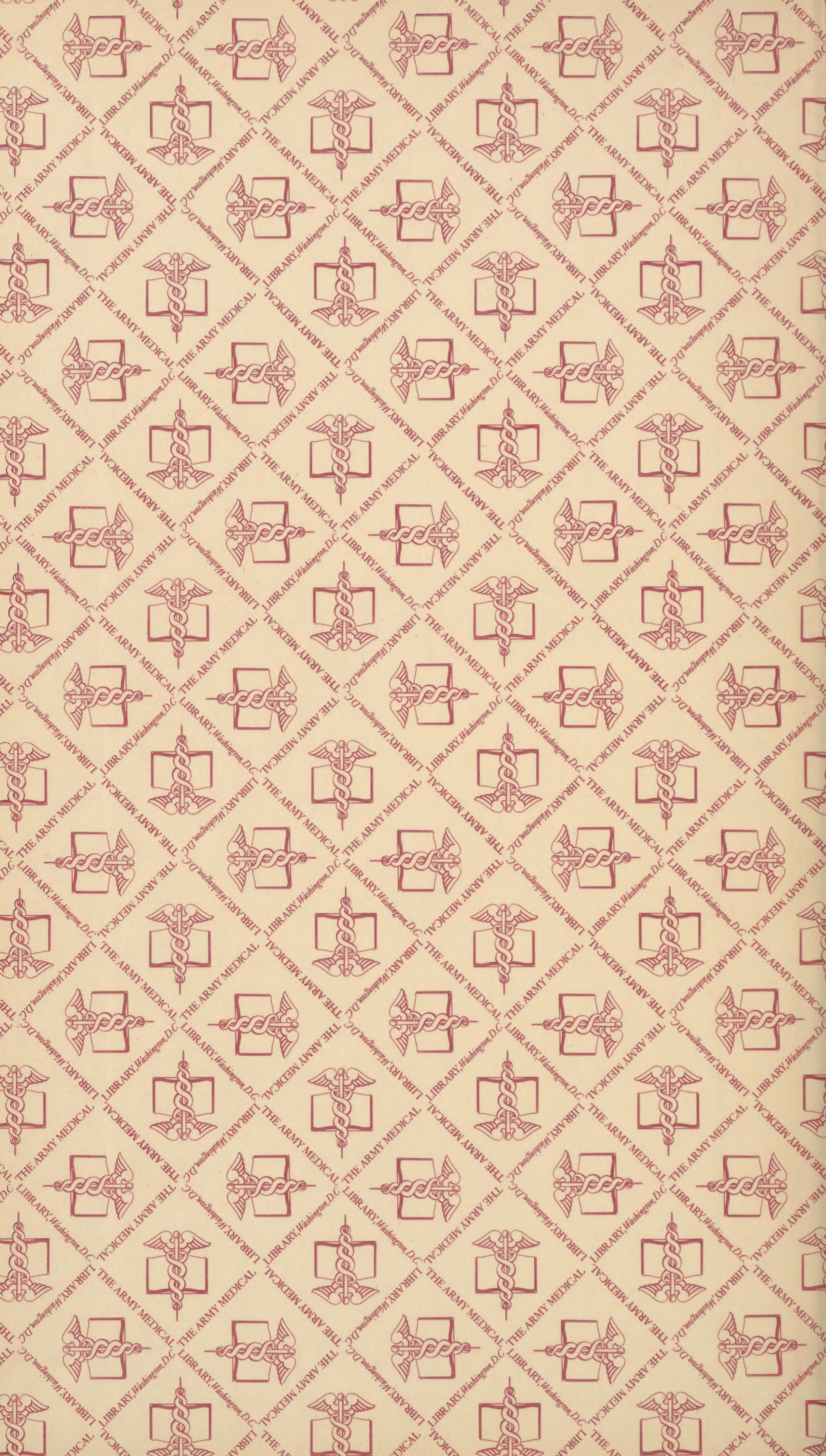
In case of good communication possibilities the ship was lying in continuous readiness in a certain coastal sector assigned to it. Medical care was given to the patrol flottilla for sea mine-laying detachments, to the convoy system as well as to other enterprises of the naval warfare. The low free board of the ship enabled us to seize and save directly from the deck those floating in the water, moreover the possiblities of rescue were increased by numerous rafts, motor boats, ladders, buoys etc. Besides the attempts at resuscitation of the drowned, the chief task of the physician consisted in the prophylaxis against death caused by chilling. Moreover the care for the wounded by experts was taken over as quickly as possible. If large groups of small naval units were lying in a small naval base or in a bay without any base on the shore, the ship took over the task of a preliminary base hospital.

The medical care of coastal bases could be performed without endangering the above mentioned tasks. After previous information, only those units and batteries of the Armed Forces were visited which could not be reached on the overland route or only with difficulty. An enlarged laboratory did much work as well as the X-ray establishments with X-ray pictures and fluoroscopy. By the investigation of fitness, by the clarification of uncertain diagnoses, by the surgical treatment and by dental treatment those soldiers were retained with the unit who would have had an extraordinary long trip to the hospital because of the peculiarity of the coast and the difficulty

in transportation. While the ship was absent from the batteries a normal sound-movie installation was an important contribution to our passing their leisure time. By acting as a floating out-patient department we got a variable idea of the coastal sector assigned to us. We were informed about the landing places of the boats, which are dependent on wind, tide and seasonal information which proved necessary on account of the snow storms of the polar nights. Thus it was possible to take over the immediate medical care in case of accidents. Besides the transportation of single persons from outlying bases, transportation with full billeting was carried through over great distances. During the transportation, medical approaches and treatment could be performed. By these measures and by the unlimited nursing and care of the soldiers and in addition by the occupation of their time with movies during the trip a recovery of the wounded could always be observed toward the end of the trip.

Just at the beginning of the Eastern campaign the ship was used for the transportation of seriously wounded out of the Petsamo sector. The ship lay in the same position as the advance hospital trains of military hospitals as far as the tactics of medical service and geography were concerned. After the wounded had been taken on board and dressed the ship corssed the waterway, which was partly dominated by Russian batteries on the Paninsula of the Fishermen, accompanied by Naval and Airforces. Artificial fogs during the continuous light of the Arctic summer as well as later on the Polar nights made the performance of this task much easier. Thus the tasks of taking the patients to the military hospitals in the rear, respectively to the large hospital ships in this sector, was carried through. If the task of transportation was not so urgent the duties of a field hospital could be taken over at the same time.

The cooperative use of the ship's berthing space, of qualified personnel, of medical and other equipment guaranteed the possibility of making a full use of the small hospital ships.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